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FINAL

ENVIRONMENTAL STATEMENT

CROW CEDED AREA COAL LEASE
WESTMORELAND RESOURCES
MINING PROPOSAL

Prepared by

Planning Support Group
Bureau of Indian Affairs
Department of the Interior
Billings, Montana

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SUMMARY

(   ) DRAFT   (X) FINAL   ENVIRONMENTAL STATEMENT

DEPARTMENT OF THE INTERIOR, BUREAU OF INDIAN AFFAIRS, BILLINGS, MONTANA

1. Type of action: (X) Administrative (   ) Legislative

2. Description of action: Approval of the mining plan for the proposed Westmoreland Resources coal strip mining operation in Tract III of the Crow Indian Ceded Area, Big Horn County, Montana.

3. Summary of environmental impact and adverse environmental effects:

   (a) Income received by the Crow Tribe from coal mined will be available for investment, tribal development or family income. Some social changes associated with urbanization are probable. (b) Surface characteristics, soil, vegetation and wildlife disruption will occur during the project life. (c) Dust and noise problems will increase in the vicinity. Sulfur dioxide emission levels will be reduced at midwestern utility plants using coal from this proposed site. (d) Ground water will be diverted from coal seam aquifers, causing a reduction in the potentiometric surface.

4. Alternatives considered

   (A) Approval of the Mining Plan
   (B) Require Modification of Mining Plan
      (1) Configuration of Mined Area
      (2) Production Rates
      (3) Alternative Reclamation Plan
   (C) Rejection of the Mining Plan
      (1) Rejection Followed by Submission of New Plan
         (a) Alternative Sites
         (b) Alternative Mining Methods
         (c) Coal Use Alternatives
         (d) Transportation Alternatives
      (2) Rejection with No Mining Allowed
         (a) Alternate Sources of Tribal Income
         (b) Alternative Supplies of Coal
         (c) Non-Coal Energy Alternatives
         (d) Other Alternatives

5. Review and coordination:

   Environmental Protection Agency*
   Federal Power Commission
   Department of the Army (Corps of Engineers)
   Department of Health, Education & Welfare
   Department of Labor
   Clearing Houses for States of:
      Montana*
      Wyoming
      North Dakota*
      South Dakota
      Minnesota
      Iowa*
      Wisconsin*
      Illinois

   Crow Tribal Council*
   Department of Agriculture*
   Department of Commerce*
   Interstate Commerce Department
   Department of Transportation*
   U.S. Department of the Interior:
      Bureau of Land Management
      United States Geological Survey*
      Bureau of Outdoor Recreation*
      Bureau Sport Fisheries & Wildlife*
      Bureau of Reclamation*
      Bureau of Mines*
      National Park Service*
      Mining Enforcement & Safety Admin.*

   *Agencies responding

6. Dates statements made available to CEQ and the public:

   Draft Statement: October 4, 1973
   Final Statement: JAN 29 1974

CHAPTER I

PROJECT DESCRIPTION

CHAPTER I

PROJECT DESCRIPTION

BACKGROUND

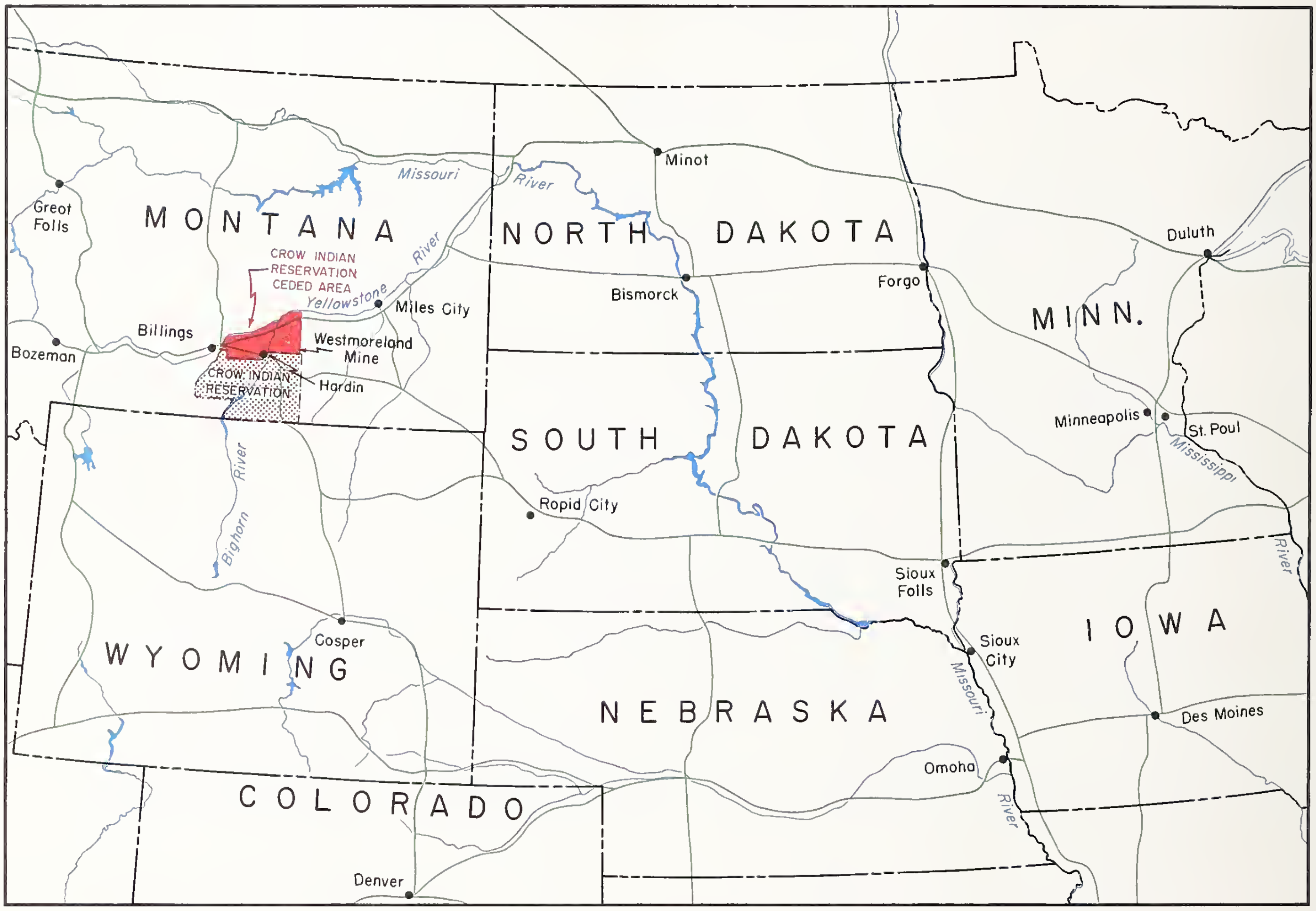
The project described in this environmental impact statement is the mining of approximately 77,000,000 tons of coal over 20 years. After extraction, the coal will be shipped by rail to the Midwest for use in power generation plants. The proposed mining location is just north of the Crow Indian Reservation on land with non-Indian surface ownership and coal rights belonging to the Crow Tribe.

The Crow Tribe owns vast quantities of coal both on and near the Crow Indian Reservation in southeastern Montana. The proposed mine is the first of many possible coal development sites that will be studied by the Crow Indians to determine the impacts and economic benefits of coal development. Map No. 1 shows the location of the Ceded Area in which the tribe has entered into lease agreements for strip mining their coal.

All actions in regard to leasing of Indian minerals, including review of mining plans, are carried out as part of the Department of the Interior's trust responsibilities to the Indian Tribes. These responsibilities include providing technical and legal assistance as needed. The policy of the Department is to approve the leasing of Indian mineral resources (1) under terms and conditions in the best interest of the Indian Tribe and (2) with appropriate environmental safeguards, including satisfaction of NEPA requirements.

MAP I

LOCATION OF THE CROW CEDED AREA IN SOUTHEASTERN MONTANA



This environmental statement concentrates on specific studies for a proposed strip mining operation planned by Westmoreland Resources and how it will affect the land within their lease on Tract III of the Ceded Area. As additional mining plans become known, specific environmental statements will be needed to cover these sites in detail and to study their cumulative effects.

Location

The Ceded Area, partially detailed in Map 2, is bordered by the Crow Reservation on the south and the Yellowstone River on the north. It lies approximately 65 miles due east of Billings, Montana, and includes the Treasure County seat town of Hysham. The County seat of Big Horn,County, Hardin, lies just south of the Ceded Area.

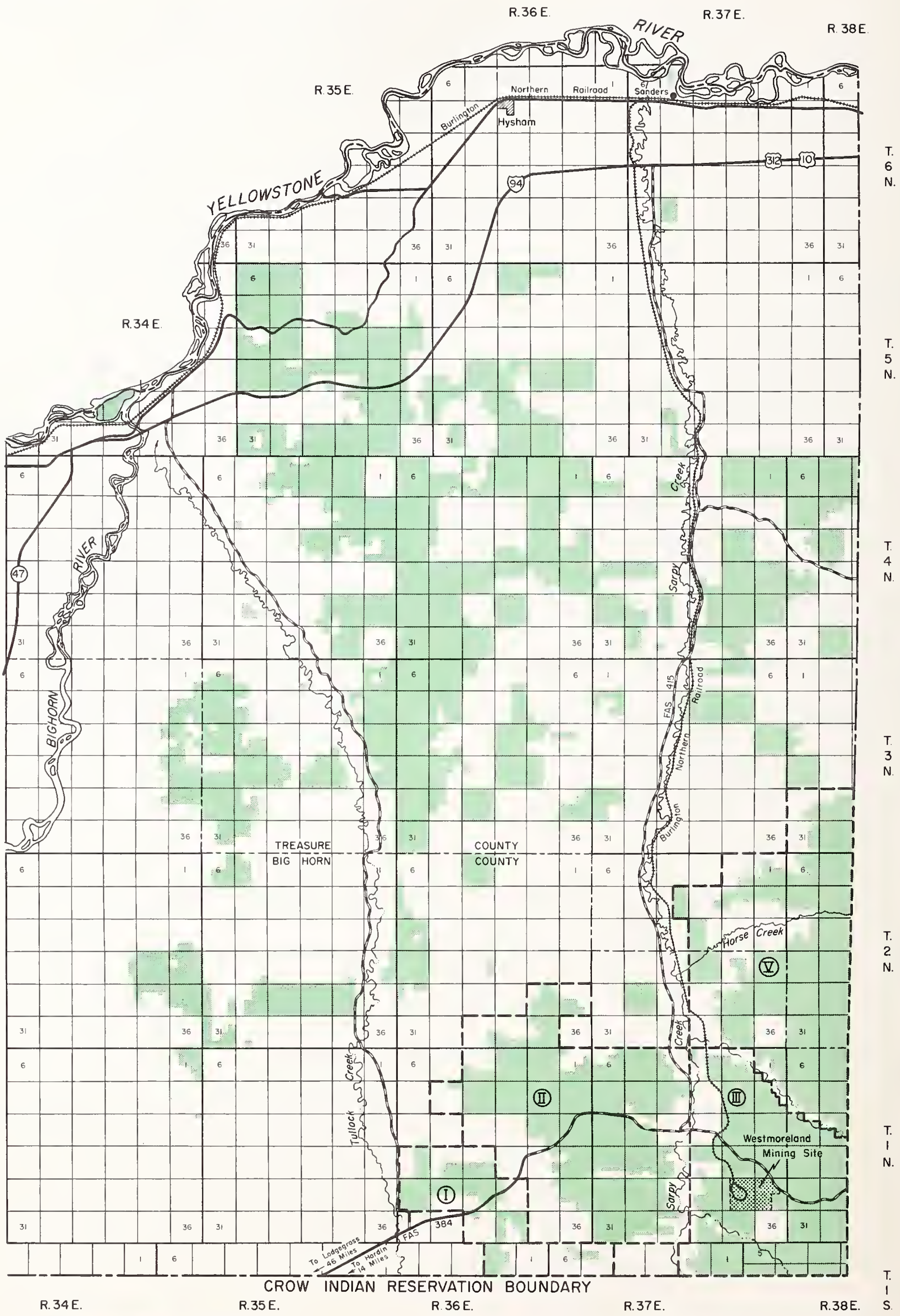
It is an area encompassing approximately 1.1 million acres. Once a part of the Crow Reservation, it was ceded to the U.S. Government in 1904 for use by white settlers.

History

The Congressional Act of April 27, 1904 (33 Stat. 352) ratified an agreement with the Crow Indians and ceded the northern portion of the reservation. Proceeds from the sale of the ceded lands to settlers were to be credited to the Indians.

Indians living on the ceded lands were permitted to remain and receive allotments on the lands they were occupying or to move to the reduced reservation and receive payment for their former lands and the improvements thereon.

MAP 2
CROW INDIAN CEDED AREA
EAST OF BIGHORN RIVER



LEGEND

🟩 Areas of Crow Tribal Coal Ownership

--- Boundary of Lease Tracts

Ⅱ Lease Tract Number

After some 54 years on the market, the Congress by the Act of May 19, 1958 (72 Stat. 121), restored to tribal ownership all of the vacant and undisposed ceded land. These lands resumed trust status and coal rights were reinstated to the Crow Indians. The coal rights, that were retained by the U.S. Government when the land in the Ceded Area was patented to the settlers, were also returned to Crow Tribal onwership. The Crow coal rights in the Ceded Area now total just over 150,000 acres. These coal rights are owned in trust by the Crow Indians and are administered for the Secretary of Interior by the Bureau of Indian Affairs. The Conservation Division of the U.S. Geological Survey acts in a review and approval capacity for the mining plan, and also supervises the adherence to the mining plan after mining begins.

Surface ownership in the more than 1.1 million acres in the Ceded Area include, approximately 9,000 acres of tribal land; 17,000 acres of allotted land; 45,000 acres of State land; and over 1,000,000 acres of private fee land.

Westmoreland Resources Partnership

In the summer of 1970, the Crow Tribe requested bids for developing the coal resources underlying four tracts in the southeastern portion of the Ceded Area. During September 1970, through open bidding, Westmoreland Resources obtained exclusive coal prospecting permits with options to lease from the Crow Tribe on portions of the Ceded Area designated as Tracts II and III. A prospecting program on the lands was instituted which culminated with the issuance of coal leases in June 1972. The coal to be mined under the submitted plan is contained within a portion of Tract III, coal lease 14-20-0252-3863. While Westmoreland retains the lease for Tract II, its spokesman state that they have no firm plans for mining Tract II coal at the present time.

Westmoreland Resources is a Montana partnership consisting of four companies: (1) Westmoreland Coal Company; (2) Penn Virginia Corporation; (3) Kewanee Oil Company; and (4) Morrison-Knudsen Company, Inc.

Site preparation, equipment assembly, and plant facility construction has begun at the site on land which Westmoreland has acquired the surface ownership. No mining activity will take place prior to approval actions in compliance with requirements of the Environmental Policy Act.

Purpose of the Project

It is the stated intent of Westmoreland Resources to mine Sarpy Creek coal and market it at midwestern power plants primarily along or near the Mississippi River. The plants furnish electrical power to customers of four midwestern utility companies located in the States of Iowa, Minnesota, Wisconsin, Illinois and South Dakota. These companies have contracted for approximately 77 million tons of coal to be furnished over a 20-year period with delivery commencing in the spring of 1974.

Westmoreland Resources has prepared a mining operation plan in accordance with Federal Regulations (25 CFR 177.7). The plan is intended to maximize recovery of coal resources and reclaim the disturbed land area. The plan was submitted in compliance with the National Environmental Policy Act of 1969, the Montana Strip Mining and Reclamation Act of 1973, and the Montana Coal Conservation Act. The mining operation will be performed by Morrison-Knudsen Company, Inc., as contractor.

Westmoreland has also filed "An Application for Approval of Mining Plan" with the U.S. Geological Survey and an application for a permit, pursuant to the Montana Strip Mining and Reclamation Act of 1973 with the Commissioner, Department of State Lands, Montana. Copies of these documents have also been submitted to the BIA, along with a copy of Westmoreland's Report.(2)

The Coal Lease

The lease with the Crow Tribe runs for a term of 10 years and as long thereafter as minerals are produced in paying quantities. It provides a royalty of 17½ cents per ton, a minimum royalty of $2 per acre per year for each of the 3rd and 4th lease years escalating to $5 per acre beginning with the 5th lease year, and an annual rental of $1 per acre. The leases provide for renegotiation of the royalty rates at the end of 10 years from June 14, 1972.

Quantity of Coal

No published data regarding coal reserves is available concerning the specific area covered by Tract III. However, the U.S. Geological Survey has obtained recent data compiled from a more detailed study of the area than had previously been done. Recoverable coal reserve estimates taken from the report indicate that Tract III contains

625,000,000 tons. The commitment calls for mining of 77,000,000 tons of these coal reserves over a 20-year period.

According to the Westmoreland Report, 308 holes were drilled primarily on Tract III from October 1970 through August 1972. The average analysis of the coal samples is reported in Table 1 and Appendix I.

Table 1. Physical and Chemical Analysis of Westmoreland Coal (On As-Received Basis)

Proximate Analysis		Ultimate Analysis	
Component	% by Weight	Component	% by Weight
Moisture	25	Carbon, C	50.18
Volatile matter	29	Hydrogen, H_2	3.65
Fixed carbon	37	Sulfur, S	.73
Ash	9	Oxygen, O_2	10.58
	100	Nitrogen, N_2	.66
		Moisture, H_2O	25.11
		Ash	9.09

BTU/lb	8,450
Equilibrium moisture	23.
Grindability index (Hardgrove)	56.

Mineral analyses, spectrographic analysis of trace elements, topographic maps, gamma ray logs, chemical analyses of coal samples and analyses of soil samples, were prepared by consultants of Westmoreland and included by Westmoreland in their report.(2)

THE WESTMORELAND PROPOSAL

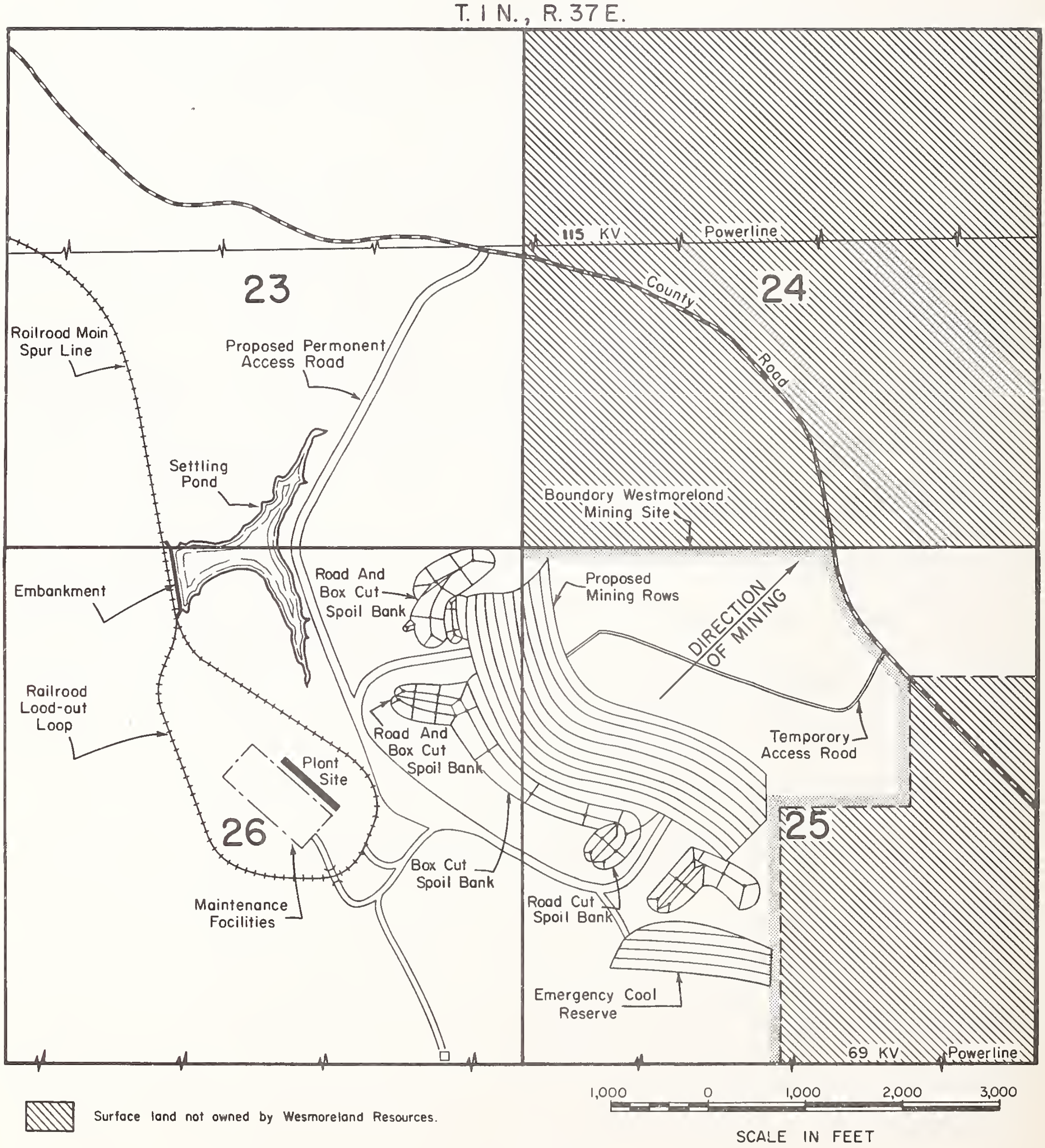
Since the project will be controlled and operated by Westmoreland Resources, the description of the methods and equipment to be used in the mine and presented in the following pages is taken, with minor editing, directly from their Environmental Report.(2) It is presented to enable the reader to utilize the information contained in this document and to better understand the proposal and its possible impact. Map 3 shows the plan view of the mine site.

Map 3 indicates initial mining to the northeast until Westmoreland abuts the boundaries of its present surface ownership which indicates mining for five to six years. Alternatives for fulfillment of the 20 year coal sales contracts (77,000,000 tons) are available to Westmoreland and at this date no one alternative is clearly preferable. Therefore after five years, Westmoreland will be required to file a mining plan covering the mining of the balance of the coal to be delivered under the 20-year contract committals. Similarly if additional contracts are made to sell more than the 77,000,000 tons, a revised plan will be needed.

The Mining Plan

The mining plan contemplates stripping 55 acres in the first year, during which an additional 75 acres will be disturbed by spoil bank placement of overburden from the box cut. In the ensuing 19 years, an additional 50 acres will be mined annually making a total of 1,080 acres over the 20-year project life. During the life of the mining operation, covered by the application for approval, the total to be

MAP 3
MINING SITE AND FACILITIES



mined and disturbed under existing contracts is 1,280 acres, or approximately three percent of the total acreage under lease. Of this, 200 acres will be disturbed by the construction of plant, roads, sediment pond, etc.

During the 20 year period, present commitment calls for 77,000,000 tons being mined, of which 3,000,000 tons will be mined during the first year of operation and approximately 4,000,000 tons in each year thereafter. The mining plant, however, with an additional investment of capital funds and equipment, would be capable of operation at a rate of 13,000,000 tons per year. The dragline, which is now being erected, has a capacity of approximately 16 million cubic yards per year.

The present plan provides for mining of several coal seams in the 1,200 acre area, namely the Rosebud-McKay seam (approximately 30 feet in thickness), the Robinson seam (approximately 20 feet in thickness), and two stray seams, each approximately four feet in thickness. The average overburden stripping ratio for the total recoverable reserves over all of Tract III will be about 3.87 to 1, relating one cubic yard of overburden to one ton of coal. The average depth of overburden above the upper Rosebud-McKay seam is approximately 90 feet. An additional 60 feet of interburden overlies the lower Robinson coal seam.

Operating Plan

Initial mining will take place on the Rosebud-McKay seam of coal, commencing with a box cut along the approximate demarcation line between coal and burned clinker. Width of the pit excavation will be approximately 110 feet. Overburden will be placed outside the cut where the Rosebud-

McKay seam has been burned and where the overburden is too great to mine the Robinson seam. The uncovered coal will be loaded into large (approximately 120 ton) off-highway trucks by rubber-tired front-end loaders of 15- to 20-yard capacity for transportation to the plant area. After the coal has been loaded from the first cut, a second cut will be dug beside the first and parallel to it, with the overburden from cut two placed in cut one. After three cuts of coal have been made on the Rosebud-McKay seam, it will be possible to remove the additional 60 feet of interburden to mine the underlying Robinson seam of coal. Thereafter, successive cuts will take both the Rosebud and Robinson seams until 77 million tons have been mined. By this technique a minimum of mine cuts are open at any one time and the overburden is kept in the mining pit except the spoil from the original box cut required to open the property. Approximately one-fourth to one-half pound of ammonium nitrate per cubic yard of material will be required to loosen the overburden for dragline removal.

Reclamation of the previously mined area will be continued simultaneously with the mining of coal. The outside of the original spoil bank will be shaped to a maximum gradient of 11° except in certain areas of unusual original topography which will be shaped to a gradient of 19°. All interior spoil banks will have a maximum gradient of 11° and the final high wall will be reduced to 20° at the conclusion of mining.

Available topsoil overlying the area for spoil placement and the area to be mined in the initial cut will be removed and stockpiled either by scrapers or by bulldozers. The topsoil from the next cut will be moved to the recontoured spoils prior to seeding of the area.

Five plant species were initially decided upon for revegetation. Other species and their use are being studied, subject to final approval by the Montana Department of State Lands. These are discussed with revegetation in Chapter IV. The reclamation plan provides for 50 acres to be revegetated annually.

The major part of the overburden will be removed by the dragline using standard two-seam mining methods to recover both the Rosebud-McKay and Robinson seams. In addition, two relatively thin unnamed seams will be recovered in compliance with State and Federal law and the regulations of such agencies as may have jurisdiction.

Mining Plant

The coal handling facilities will consist of truck dumping facilities, primary and secondary crushers and coal storage of 50,000 tons in a covered trough-type facility, approximately 700 feet in length. Input to the coal storage facility will be at the rate of 2,000 tons per hour. That facility will also contain fire sprinkling equipment. Load-out will be accomplished by two rotary plows working in a tunnel underneath the storage facility, discharging coal to a 72-inch conveyor belt at the rate of 4,000 tons per hour. This coal will be delivered to a 250-ton hopper located directly over the railroad track and loaded into 10,000-ton unit trains moving past the loading point continuously at a rate of one-half mile per hour.

A 75 cubic yard dragline, front-end loaders, coal hauling trucks and other necessary equipment will be utilized for the extraction and initial transportation of the coal, following blasting and removal of the overburden. The dragline is 215 feet in height and the distance between the rear of the cab and the drop line of the bucket is 351 feet. Length of the dragline boom is 320 feet and the working length is 290 feet.

The facilities will also include shop, warehouse, service and storage buildings. The maintenance facilities will have a fire sprinkling system.

Time Schedule

The proposed time schedule for the development of this plan is as follows:

(1) Erection of the dragline was started on January 1, 1973 and should be completed by December 31, 1973.

(2) Construction of the plant facilities will commence during 1973 and should be completed early in 1974.

(3) Burlington Northern commenced construction of the rail spur in the fall of 1972 and it should be completed in the spring of 1974.

(4) The dragline will start operation approximately February 1, 1974, in order to provide adequate training for personnel and to develop an inventory of coal for shipment. A blast hole drill will be put in operation simultaneously with the start of operation of the dragline.

(5) Front-end loaders, coal haulage trucks, and other necessary equipment will be on site to start initial coal removal by April 1, 1974.

(6) Approximately 75 acres of overburden spoil material from the initial box cuts is scheduled for recontouring procedures during 1974 and for seeding and reclamation either in the fall of 1975 or the spring of 1976. Thereafter, an average of 50 acres of mined area will be reclaimed annually. The area disturbed by the construction of the railroad and plant facilities will be available for reclamation procedures during the fall of 1974 or the spring of 1975.

Mine Auxiliary Services

Supporting mine auxiliary services include roads, electric power equipment and distribution, water and sewer service, sediment control, and rail loop.

Roads - A mine access road will be constructed to the mine site from the existing gravel county road presently in use. The road will be less than two miles in length and, together with the necessary grading, will occupy 19 acres. The interior mine road system will consist of two (and possibly three) mine haul roads constructed on a zero grade from the truck dump. These interior roads will occupy 24 acres.

Power Requirement and Distribution - At the present time the Montana Power Company is operating a 115-kv transmission line, crossing approximately one mile north of the mine site. A 69-kv overhead service line will be constructed to deliver power to a control location at the mine.

Transmission voltage delivered to the dragline and drill will be 69-kv. Power distribution to the coal handling facilities will be 4.16-kv, and will be by an underground power line.

Distribution from the main transformer station to the equipment load centers will be partly by high-voltage insulated cables laid on the ground along paths cleared of combustible materials. Adequate grounding and ground fault protection will be built into the system at circuit breakers, transformer banks and switch banks to insure safe operation of the electrical system, in compliance with the Federal Coal Mine Health and Safety Act of 1969.

Water and Wastewater Facilities - Summer water requirements over the project life for the mine will range from 90,000 to 250,000 gallons per day to provide for road sprinkling, fire protection, and sanitary purposes. It is planned to drill at least one deep water supply well (the Madison limestone aquifer will probably be utilized) and construct a 150,000-gallon water storage tank. Possibly, water for domestic use will have to be treated in order to make it potable. A sewage treatment plant will be constructed to treat domestic wastewater from the mining facilities. Both the well and sewage plant will be constructed and operated according to applicable state and federal regulations.

Sediment and Erosion Control - A combined railroad loop access embankment and detention dam, creating a sediment detention and mine drainage pond, will be constructed approximately one-half mile downstream from the mining plant location. The combined railroad embankment and dam embankment will be of earth fill construction utilizing about 400,000 cubic yards of fill material. The embankment at the top of the railroad will rise approximately 91 feet above the coulee floor. The crest length of the dam will vary from 520 feet to 535 feet. The dam embankment slope will be at a 2 to 1 ratio. The railroad embankment slope will be at a 1 3/4 to 1 ratio. The outlet works will consist of a six-foot diameter spillway outlet conduit and a glory hole type spillway having a crest elevation of 3,415. A detention pond storage volume of 77 acre feet and surface area of nine acres will occur at the spillway crest elevation.

Drainage System - A drainage system will be constructed and maintained to minimize accumulation of surface water in the mining pit. Water which may result from direct rainfall or sub-surface seepage will be pumped out promptly to prevent the possibility of deleterious effects caused by water coming in contact with the disturbed land within the mine pit. The seams to be mined contain less than one percent sulphur, and water now emanating from the lower seam is alkaline. If acid conditions should develop, this water will be treated chemically to prevent any harmful effects.

Mine Personnel Requirements - The construction phase of the mine will require approximately 175 workers to erect mining, crushing, storage, and loadout facilities from commencement to about April 1, 1974. These workers will erect mining equipment and facilities and will receive an estimated $2,000,000 in wages. Mine operation, when commenced, will create approximately 90 permanent positions (including labor, supervisory and administrative personnel) generating an annual payroll of approximately $1,500,000. The lease agreement provides that first priority for employment be extended to members of the Crow Tribe of Indians. Additional labor sources would be surrounding towns and Billings, Montana. Training will be provided by the mining contractor for inexperienced personnel. A small portion of the work force would be highly skilled or management personnel supplied from other labor markets. The demand for housing would be met by commercial developments in established communities. The increased tax base would permit expansion of necessary community facilities.

The Rail Loop - Westmoreland will construct a rail loop which will connect with the Burlington Northern spur line, pass under the mining plant's coal loading facility and enable the railroad to load the unit train which will transport the coal to its destination. A portion will pass over the sediment dam. The loop, which will cost approximately $500,000 will be approximately 8,000 feet in length and, together with the necessary grading will occupy 16 acres of land.

The Railroad Spur - Burlington Northern, Inc., has commenced to construct and will operate a new railroad spur line to serve the Westmoreland Resources coal mine. It will originate from Burlington Northern's main line at a point approximately two miles west of Sanders, Montana, and in general, follow along Sarpy Creek for a distance of 36 miles to the coal mine loading site. Upon completion of construction of the spur line and loading tracks, unit train loads of coal will be hauled from the mine to electric power-generating plants located in the midwest. It is initially planned to operate several 108-car trains each week over the branch line. In addition to the outbound coal traffic beginning in April 1974, there will be inbound movement of material and supplies for the mine.

The branch line will be built with continuous welded 112-lb., 131-lb., and 132-lb. rail on treated crossties spaced in accordance with Burlington Northern general railroad construction standards. Elevation of the branch line track at its origin point where it will connect to the main line is 2,610 feet above sea level. Elevation of loading track at the mine site will be 3,482 feet above sea level. Maximum or ruling grade will be 1.00 percent for the first 29 miles and 1.25 percent for the last 7 miles. There will be two sidings each 7,400 feet long, one at MP 19.0 on the branch and the other adjacent to the mine loop or loading track. A short spur track 500 feet long, will be located at MP 11.4 on the spur.

Total volume of excavation in construction of the line is estimated at 3,735,000 C.Y. Total amount of embankment fill is estimated at 3,600,000 C.Y. The spur line right-of-way will vary from 100 to 275 feet in width. Construction cuts along the spur line will be minimal since the route follows the Sarpy Creek Valley.

Of the 144 cuts along the 36 mile spur, nearly 1/2 are under 10 feet; 30 are between 10 and 19 feet; 14 are between 20 and 29 feet; 18 between 30 and 39 feet; and 18 over 39 feet. The cuts and fills will be shaped and revegetated.

The spur line will cross U. S. Highway No. 10 at grade at MP 0.14. Automatic flashing light railroad-highway crossing signals will be installed to protect the crossing. An underpass grade separation structure will be constructed under U. S. Highway No. 1-94 at MP 2.5 on the spur and two grade separations using large diameter culverts will be installed on two of the county road crossings. Two additional County and State secondary railroad-roadway crossings will have automatic flashing lights while one crossing will have standard crossbucks.

A 73 inch x 45 inch reinforced concrete pipe arch structure with flared ends will be installed at the crossing of the Hysham Irrigation Canal. A five-span pile trestle bridge will be constructed at the Yellowstone Irrigation Canal crossing. Bridges will be constructed over Sarpy Creek, Beaver Creek, Bear Creek, Horse Creek, East Sarpy Creek and an unnamed creek at MP 20.1 on the spur.

The railroad right-of-way will be fenced with hog-tight fencing. There will be a number of reinforced concrete cattle passes placed at various locations as required by owners of abutting property through whose lands the spur line will extend.

More than 200 culverts will be placed to control and implement surface drainage. One irrigation ditch siphon will be installed. The culverts and bridge structures to be constructed have been designed on the basis of 50 year flood criteria. An estimated 15,000 cubic yards of riprap will be used to prevent erosion adjacent to bridges and culverts. Impoundment of water at drainage structure may occur for short periods of time only during floods exceeding a 50 year frequency of recurrence.

Timber Handling

Westmoreland will establish a small sawmill near the mining site. This mill will process timber cleared from the mining and facility sites and harvest a portion of the timber from certain lands owned by Westmoreland near the mining site. The amount of timber to be harvested over the 20 year life of the proposed project will not exceed 500,000 board feet.

Sales Contracts

Of the total minable tons under Tract III, Westmoreland Resources has contracted to sell approximately 77 million tons under four contracts dated June 15, 1972. Approximately 73 percent of that tonnage has been sold to Northern States Power Company. The other three contracts are with Dairyland Power Cooperative, Interstate Power Company, and Wisconsin Power and Light Company. After a two-year startup, the four contracts call for an aggregate of four million tons to be mined and shipped annually. The coal will be shipped F.O.B. railroad car at Westmoreland Resources mine and will be delivered on an even monthly basis. The four sales contracts expire on December 31, 1993. The sale price of the coal is subject to various cost adjustments.

Under an agreement dated December 1, 1971, Westmoreland Resources granted Colorado Interstate Gas Company an option to acquire up to 300 million tons of coal. This option may be exercised at any time prior to November 30, 1981. The purpose of the option was to insure for Colorado Interstate Gas Company a supply of coal for potential future gasification. There is no commitment by that company to locate a gasification operation at Sarpy Creek and it has indicated to Westmoreland Resources that at this time, it is not actively pursuing coal gasification.

Westmoreland Resources has 248 million tons in Tract III uncommitted, which it anticipates shipping by rail to coal-burning utilities. No additional sales have been made of this coal.

"Environmental Assessments or Impact Statements" would be prepared: Should additional coal sales require significant changes of the mining plan, an environmental assessment would be made as required by Department of Interior practice and, if required an environmental statement would be prepared prior to project approval.

Transportation and Delivery of Coal

The coal will be trasnported by unit train from the mine over the Burlington Northern spur to a junction with the railroad's main line at a point two miles west of Sanders, Montana. From there it will be hauled to the future Pigs Eye Coal Terminal in St. Paul, Minnesota, where it will be dumped in a coal storage yard. See Map No. 4.

It should be noted that the Pigs Eye Terminal is still in the planning stages. If its construction is delayed, or for some reason it is not built, the customers are still obligated to take delivery of the coal and alternative means of transportation will be found. However, at this time there is every reason to believe the terminal will be built.

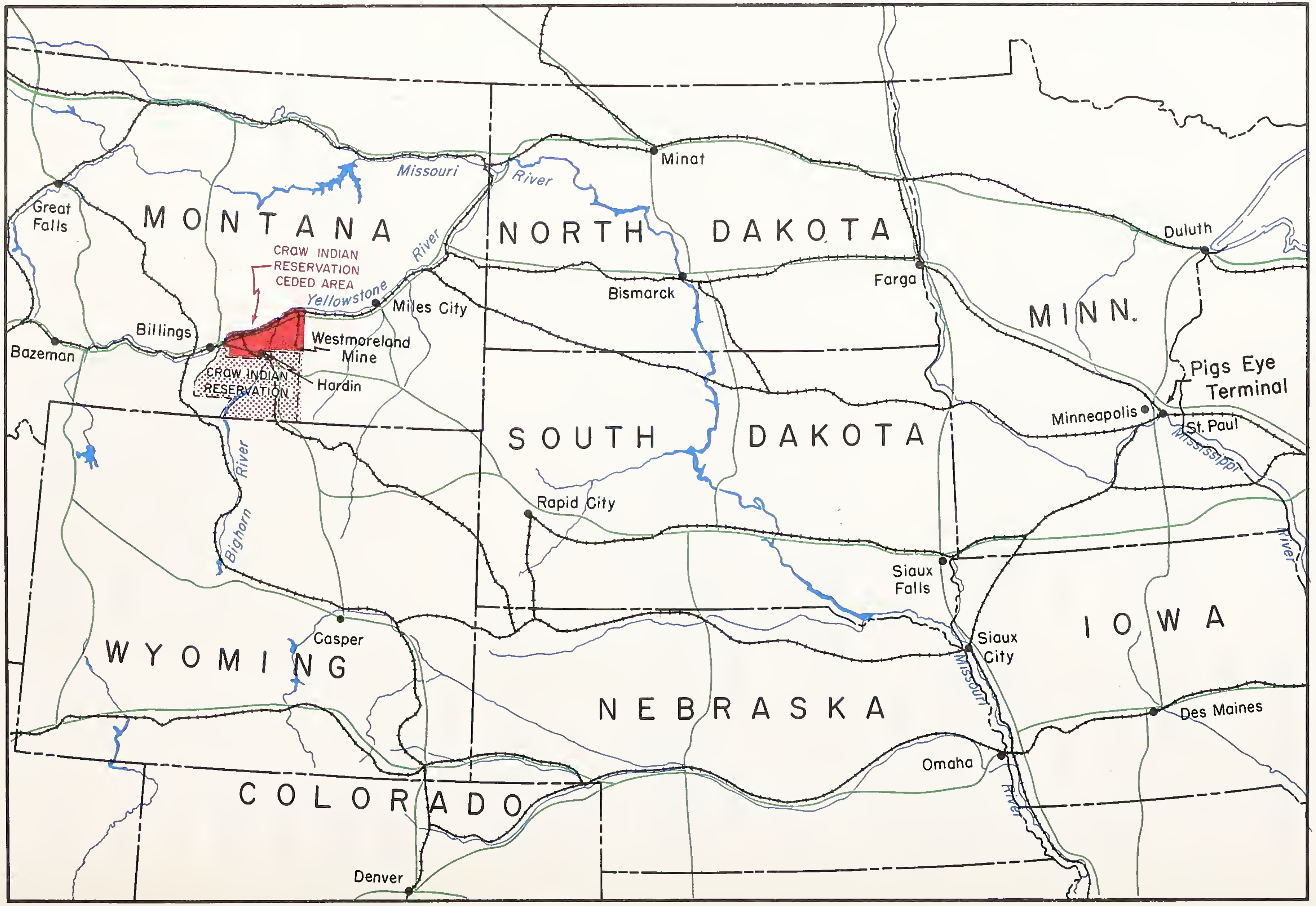
During 1974, 2.6 million tons of coal will be transloaded into 1,500-ton barges at the terminal and transported by tow on the Mississippi and its tributaries to the generating plants of the four public utility companies who have purchased the coal.

On the up river barge movements, four to six barges may be included in a tow. On the down river shipments, 15 barges may take a single tow.

During 1974, Northern States Power will receive 1.5 million tons, of which one million will be delivered to its Allan King Plant on the St. Croix River, and 500,000 tons will be delivered to its Black Dog Plant on the Minnesota River; 300,000 tons will be delivered to Wisconsin Power and Light Company at its Cassville Plant at Cassville, Wisconsin; 500,000 tons will be delivered to Dairyland Power Cooperative and divided between its plants at Cassville, Alma, and Genoa, Wisconsin; and 300,000 tons will be

MAP 4

RAILWAY AND PIGS EYE TERMINAL



transported to Interstate Power Company and divided between its Dubuque, Lansing, and Clinton plants. All of these plants are beside the Mississippi River and downstream from the coal terminal, except the Black Dog Plant, which is on the Minnesota River, and the Allan King Plant, which is on the St. Croix River.

In the last 19 years of the mining operation, a total of four million tons will be delivered each year with the additional 1.4 million tons all consigned to Northern States Power. The plant destination of that coal is yet uncertain, but in all likelihood the coal will be delivered by unit train directly to the plants.

The Pigs Eye Coal Terminal

The Terminal is a coal storage plant and transloader which is being planned by the Port Authority of St. Paul at a cost of $16,500,000. It will be located near the Hoffman Avenue Railroad Yard and will contain a spur track parallel to the storage yard for the accommodation of a unit train.

The Terminal will contain a 60 acre coal storage area capable of storing 1.7 million tons of coal. A wharf 3,000 feet long and 100 feet wide will be constructed and a 6,300 foot conveyor will lead from the coal storage area up to the wharf. An application by the Port Authority is now pending with the Corps of Engineers for a permit to dredge 3.5 million cubic yards of fill from the Mississippi River to serve as a foundation for the wharf.

The coal in the storage yard will be stacked up to 41 feet high and will be transported to the wharf area by a conveyor belt. Use will be made of a telescopic boom for a rapid load-out, and there will be storage room for up to 80 barges in a fleeting area to the south.

The storage facility is being financed by tax-exempt bonds of the Port Authority and it will be leased to Northern States Power for a period of 20 years, with provision for renewal. The Port Authority will install the operating machinery and Northern States Power will maintain the facility. The storage yard and transloaders will be operated by Valley Camp Coal Company under a contract with Northern States Power.

Initially, only the coal mined at Westmoreland's Sarpy Creek mine will go through the Terminal, but it will have an annual capacity of 7,500,000 tons of coal. The design and operating procedures for the facility are such that large users such as electrical generating companies are most likely to use it, but it can be used by small concerns as well.

An Environmental Impact Statement entitled "Pig's Eye Coal Terminal, Mississippi River at St. Paul, Minnesota" covering the terminal and shipping facilities in detail has been prepared by the Corps of Engineers. This statement was released July 3, 1973, and inquiries should be addressed to the District Engineer, St. Paul District, Corps of Engineers, 1210 U. S. Post Office and Custom House, St. Paul, Minnesota 55101.

Consumption of the Coal

The Montana coal will be burned in existing plants where the present companies state that space does not permit installation of commercial sulfur removal systems. In addition, while sulfur removal systems are available, equipment in the large sizes needed have not yet been completely proven.

The activities of the four utility companies which have purchased the coal is described briefly below.

Northern States Power operates in South Dakota, Iowa, Wisconsin, and Minnesota. It serves approximately 3 million people in 630 communities over a 40,000-square mile territory. In 1971 NSP had 3,283 megawatts on stream. It has the following coal fired generating plants: Black Dog, High Bridge, J. L. Lawrence, Minnesota Valley, Red Wing, Riverside, Wilmarth, Winona, and Allan King. Approximately 1,900,000 tons of low-sulfur coal will increase to 2,900,000 tons from 1976 to 1993. All of this is under contract from Westmoreland Resources.

Diaryland Power Cooperative serves 27 utilities in Wisconsin, Iowa, Minnesota, and Illinois. In 1971 it served 121,427 customers and billed 1,664,379,837 kilowatt hours.

Interstate Power Company serves customers in Iowa, Minnesota, Wisconsin, and Illinois. Its billed kilowatt hours in 1971 amounted to 2,409,493,000 and it served 134,920 customers. It exports power to Kansas City over a 345 kilovolt system and to St. Louis over a 345 kilovolt system. It operates coal fired plants in Iowa at Dubuque, Milton L. Capp, Lansing and Mason City; and in Illinois at Clinton.

Wisconsin Power and Light has 728 megawatts of coal fired plants on stream. The plants are: Black Hawk, Edgewater, Nelson Dewey, and Rock River.

CHAPTER II

ENVIRONMENTAL SETTING

CHAPTER II

ENVIRONMENTAL SETTING

GENERAL SETTING

Topography

The Westmoreland lease is located in a rolling rangeland peaked with frequent groves of ponderosa pine. Swales between the hills lead to coulees and streambeds that form the Sarpy Creek drainage basin. Within Westmoreland Tract III the elevations range from about 3,200 to 3,800 feet.

The property to be mined lies along a ridge, rising some 300 feet between Sarpy Creek and its east fork, about six miles southeast of their confluence. From the highest point, the land to be mined slopes west (2 to 8 percent) to a dry watercourse which becomes progressively steeper one mile from the mine (up to 30 or 35 percent), whence the watercourse drops over a meandering route to Sarpy Creek. To the east, tree-covered ridges connected by grassy saddles stretch to the Little Wolf Mountains. Figure 1 presents a typical view of the area, illustrating the topography and vegetation.

The railroad branch line will extend northward from the Westmoreland mine through the Ceded Area to the main line of the Burlington Northern. It will generally parallel Sarpy Creek, which flows on a reasonably straight course to the Yellowstone River. The roadbed will lie above the flood plain and for the most part, east of the creek. (Map No. 2).

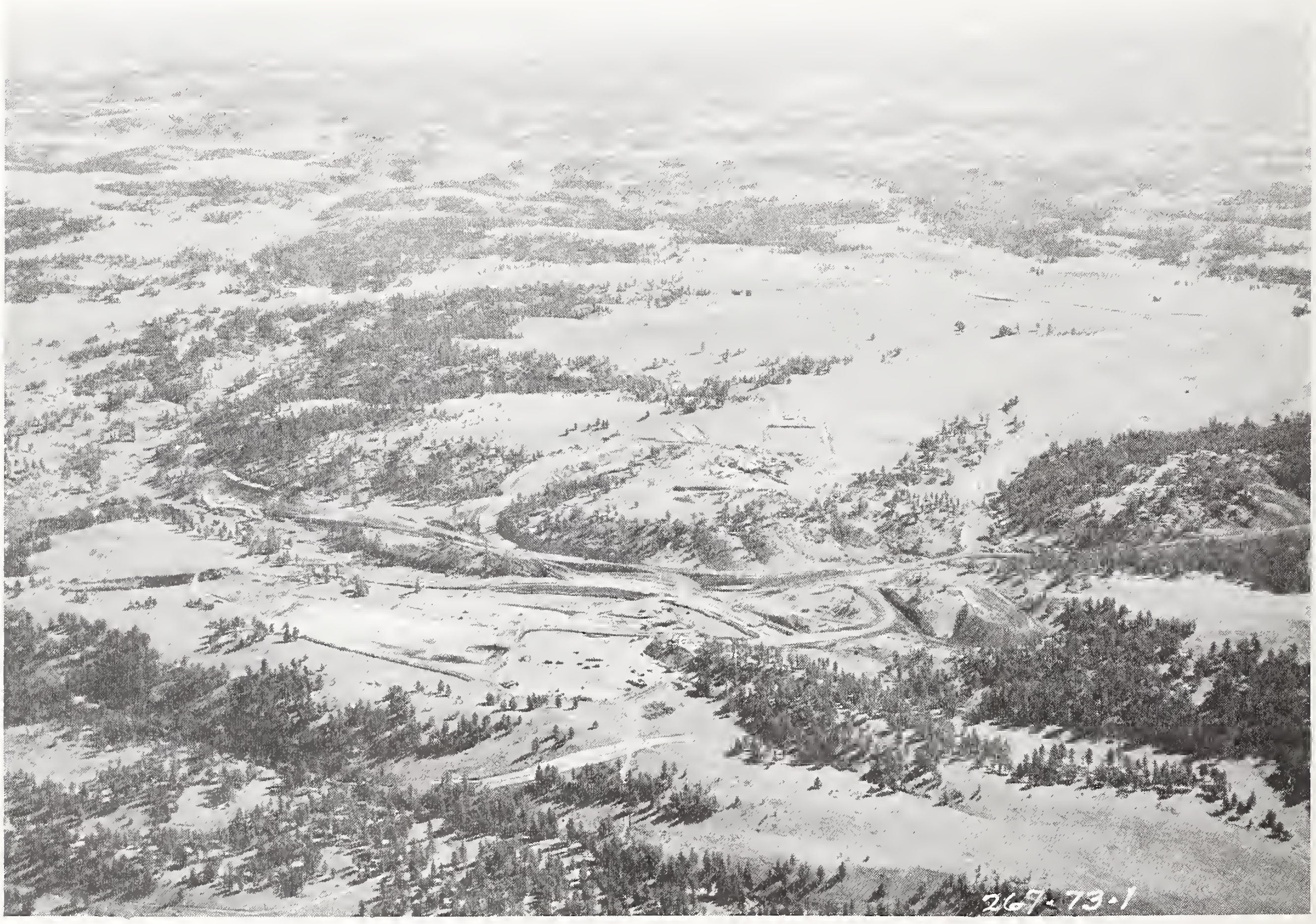


Figure 1 - Photograph of Westmoreland Property and Environs

Along the route followed in Big Horn County north of the mine, the flat bottom valleys of Sarpy Creek and East Sarpy Creek are up to a mile and a half wide, usually bordered by steep slopes which rise to gently rolling upland country. Much of this bottomland is arable and is used for alfalfa and other crops. After the creek flows into Treasure

County, it enters a narrow canyon that soon opens again into a wide valley shielded by high ridges. Further north through Ts. 4 and 5 N., the land is broken and rough until the broad plain of the Yellowstone River is reached.

The rail spur will cross six major tributaries to Sarpy Creek, of which the East Fork, Beaver and Bear Creeks have the largest drainage areas.

Climate

The proposed project is located in the path of one of the continent's major upper air flows.(3) As a result, pressure systems continually pass through from the west or northwest traveling in an easterly direction. The pressure systems vary with the season of the year, causing a flow of cold arctic air from western Canada and storms from the Pacific to dominate the winters, while in the late spring and early summer, moist warm air from the Gulf of Mexico brings a major portion of the area's yearly precipitation. By late summer and early fall the weather becomes hot and dry. The overall climate is considered semiarid.

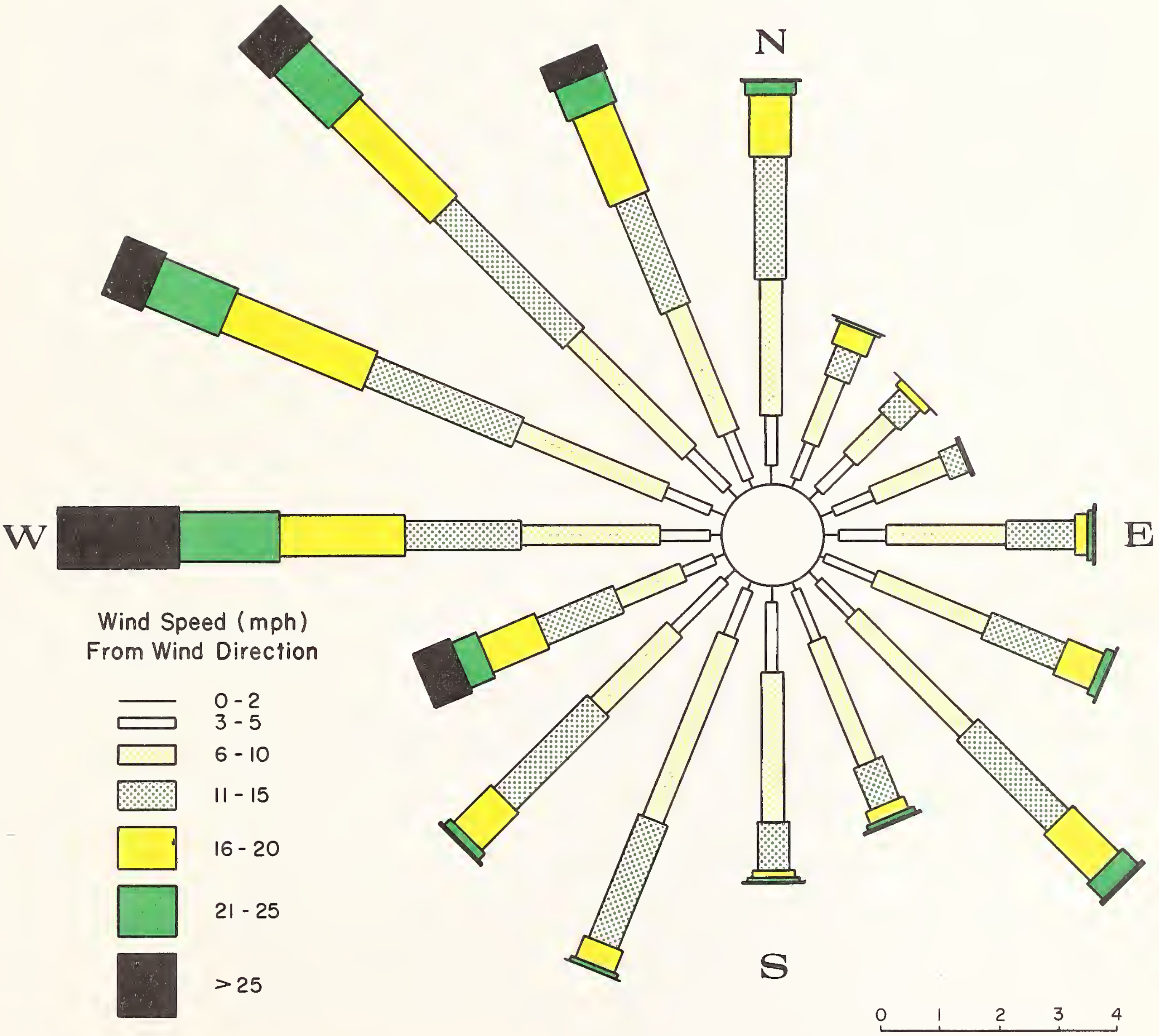
At the surface, air flows are influenced both by circulation around the pressure systems and by the topography. No wind direction or velocity data is available for the area encompassed by the Westmoreland leases but it has been collected by Montana State University for the town of Colstrip, some 25 miles to the east.(3) A wind-rose, illustrating direction and velocity averages at 307 feet above ground surface is shown in Figure 2. A summary of their data indicates that the velocity ranges from 0 to more than 25 mph with the predominant direction being from the NW quadrant, and the least predominant from the NE.

Climatological data relating to temperature, indicated January mean minimum and maximum temperatures are 4°and 32° respectively. July mean minimums and maximums are 54° and 90°. The lowest temperatures recorded in the area are near -40° F, while the highest exceeds 100° F. Annual precipitation averages 15 to 16 inches.(4) Results from gauging stations bracketing the Westmoreland lease are shown in Table 2.

Table 2. Climatological Data at Selected Sites in the Region

Parameter	Hardin 1951-1971	Hysham 19SSE 1961-1970	Colstrip M.T. 1961-1971
Annual precipitation - average	14.79"	15.03"	16.46"
Annual precipitation - range	10.21-17.19"	10.89-18.43"	12.99-19.84"
Annual snowfall - average	33.3"	No record	45.8"
Growing season precipitation - aver.	9.93"	11.94"	11.74"
Growing season precipitation - range	4.70-13.84"	7.88-14.78"	8.21-14.80"
Growing season days above 32^0 F - average	125	112	118
Growing season days above 28^0 F - average	149	129	143

FIGURE 2
COLSTRIP WIND ROSE



Compiled from wind data taken at Colstrip, Montana by Montana State University for the Montana Power Company. Instrument was in operation at top of 307 foot tower from November 12, 1971 - November 11, 1972.

Note: The summation of all the directions equal 100 percent.

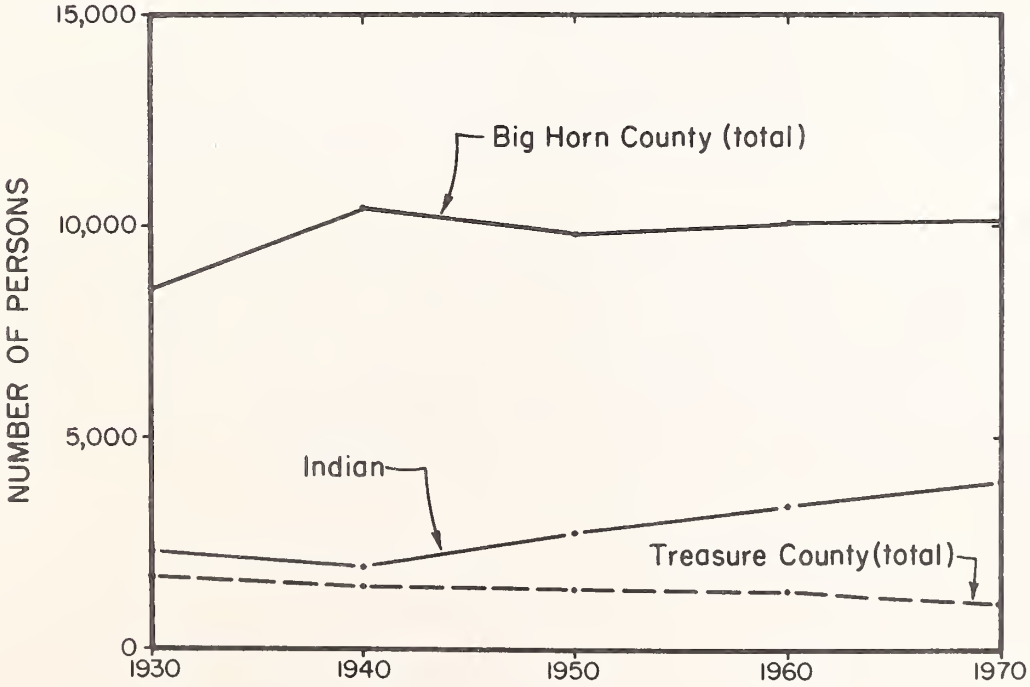
HUMAN ENVIRONMENT

The People

The population of Big Horn County, in which the Westmoreland leases are located, has been relatively stable over the past 40 years at approximately 10,000 persons. Treasure County, lying approximately north of the lease site had only 1,069 persons in 1970 and has experienced a steady decline since 1930. The Indians in Big Horn County have, on the other hand, had a continuous population growth since 1940. The U.S. Census of Population indicated an Indian population of 3,917 (primarily Crow members) in Big Horn County in 1970 while the tribal estimates based on enrollment statistics would indicate a higher Crow resident population at somewhat over 4,000. Figure 3 shows population trends for the two-county area graphically for a 40-year period.

FIGURE 3

POPULATION TRENDS
IN BIG HORN AND TREASURE COUNTIES



The Sarpy Census Division population was 215 in 1970, down from 246 in 1960. Of the 215, only 16 were Indian. The Sarpy Division encompasses the mining site and is divided almost equally between the reservation (the extreme northeastern corner of the Crow Reservation) and the Ceded Area (the southeastern part of the Crow Ceded Area).

The culture of the people, both Indian and non-Indian,in the region of the proposed Westmoreland coal mining site is highly influenced by generations of living in close association with nature. It is the often expressed opinion that, among both races, the local people have developed a way of life and a system of values, that reveres land, open space.

The culture of the Crow Indians and the heritage of their people is more accurately described below by a tribal member.

> "The Crows are of Siouan origin but had broken away from their ancestral group (Hidatsa) and settled along the valleys of the Yellowstone and Big Horn long before the coming of the white man. This tribe was originally called Absarokee which means 'Children of the large beaked bird' (probably raven).(5)

> "The Absarokee Tribe evolved through several stages of cultural development. The early ancestors who lived in the eastern forests practiced agriculture and achieved a fairly high level of civilization. As they were pushed westward, they gradually

> became more and more dependent upon the hunt. By the time of their settlement on the plains, their agricultural pursuits were limited to the planting of corn and squash. Soon after their separation from the main Tribe (probably somewhere in what is now North and South Dakota), the Absarokee abandoned agricultural ways and became a nomadic people." (5)

Early dependence on the land has influenced the cultural values of the Crow Nation. "Personal gain and the accumulation of private wealth has little prestige value in the Crow communities." (5)

Religion also has an influence on a people's culture. "The old time Crow Indians recognized a supreme being whom they called 'First Maker' but did not worship it directly. They sought its benevolence and favor through the worship and devotion to various animals and objects of nature which were regarded as possessing supernatural powers given them by the 'First Maker.' " (5) Although virtually all Crow Indians are now heavily influenced by the Christian religion, elements of their old time beliefs in nature still prevail.

While the culture of the non-Indians in the area has seemed to vary greatly from that of the Crows, it developed many similar traits. The basic love for land dominates the life of both groups.

The Economy

The present economic base of the Ceded Area is cattle ranching with a small secondary base in grain production. The towns of Hysham and Hardin are oriented to service agricultural needs, having little if any industrial payroll.

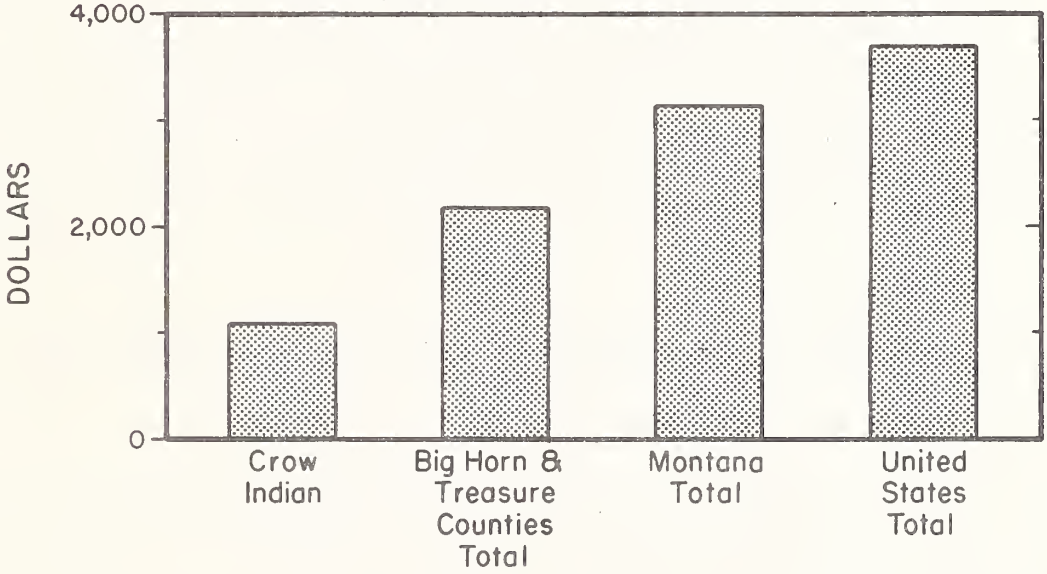
The economy of the immediate area surrounding the mining site is based predominately on cattle ranching. Nearly year-long grazing of livestock is practiced with supplemental winter feeding. Winter feed crops, together with small quantities of cash grain are grown by local ranches on the land areas suited to cropping. Even with agriculture predominating the economy, the census data indicates that family income in the Sarpy Division was made up of $486,200 from wage and salary income (including wages for farm hands) and $307,700 from farm self employment. Big Horn County has a somewhat more diversified economy than the Sarpy Division due to the trade center of Hardin and the government employees at Crow Agency and Hardin. Treasure County is almost entirely dependent on the agricultural sector.

If coal mining does not take place, the economy would not likely change appreciably from that of today. The population would probably continue decreasing as the ranches consolidate into larger units and the service industries migrate toward the larger urban center at Billings.

Income levels of Big Horn and Treasure County residents are lower than that of Montana or the nation, while the income of the

Indians on the Crow Reservation is substantially lower still. Income, expressed on a per capita basis, is shown graphically in Figure 4.

FIGURE 4
PER CAPITA INCOME
CROW INDIAN, BIG HORN AND TREASURE COUNTIES, MONTANA, AND UNITED STATES



Low family income levels indicate high poverty levels. Using the 1970 census poverty index, it was determined that among the resident Crow Indian families, 39.4 percent are in poverty. By comparison, 21.4 percent and 17.2 percent of all families in Big Horn County and Treasure County respectively are below the poverty line, while the figure is 10.4 percent for all of Montana. The nation-wide poverty threshold for a farm family of four headed by a male was $3,197, while for a family of 6.16 (the average size of Crow families in poverty) the index was approximately $4,500.

Employment in Big Horn and Treasure Counties is highly dependent on agriculture, government, and the service industries. According to the 1970 census, employment in the Agriculture, Forestry, and Fisheries category constituted 30 percent of the employed work force with the remaining 70 percent well distributed over all other occupational categories.

The 1970 census reported a civilian labor force of 3,777 (2,653 male and 1,124 female) for Big Horn and Treasure Counties with 4.3 percent unemployed. Comparable work force figures for the Crow Reservation indicate 440 male and 216 female for a total of 656 with approximately 12 percent listed as unemployed. The unemployment rate is not excessive in Big Horn and Treasure Counties but on the Crow Reservation proper, unemployment is often quite severe.

Using somewhat different definitions for labor force and unemployment, the Bureau of Indian Affairs, in its March 1973 Labor Force Report, shows that there were 363 unemployed Indians among the Crow resident population (29 percent of the labor force). Of these, 190 were actively seeking employment (15 percent of the labor force). Over the past 10 years, the BIA Labor Force Reports have repeatedly shown the unemployment of the Crows to be as high as 30 percent with approximately one-half of these actively seeking work.

Transportation

The only direct means of transportation into the area of the Westmoreland lease is along county roads which meander from Hardin to Hysham and Colstrip (see Map No. 2). Montana secondary highway No. 384 in Big Horn County is paved for 12 miles east from Hardin, after which it becomes gravel and changes name and number to County Road No. 2. It passes just north of the area to be mined, ending at farms east of the site. Two miles west of the area to be mined, County Road No. 38 connects and carries traffic to Hysham and Colstrip. The distance from that intersection to Hardin, Hysham, and Colstrip is about 26, 35, and 35 miles respectively. Until mine development began, the roads were used primarily by the few farmers and ranchers of the area and traffic was minimal.

The closest major highway is Interstate 90, some 27 miles west near Hardin. Interstate 94 passes about 30 miles north in the Yellowstone River valley near Hysham.

The nearest major railroad is the main line of the Burlington Northern about 32 miles north. A branch line to Sheridan, Wyoming lies 27 miles west while a spur extending south near Forsyth to Colstrip lies 23 miles east.

Commercial air service may be obtained in Billings, about 70 air-miles or 80 road-miles west of the mine. Air strips capable of serving small aircraft are located at Hardin, Hysham, and Forsyth. No airstrips are planned at the mine site.

In addition a 12-inch gas transmission line passes along the north side of the Westmoreland leases. It is owned by the Montana-Dakota Utili-

ties Company and conducts gas from central Wyoming north to various points served by the utility.

History and Archeological Sites

Historical and archeological data thus far gathered indicate that both prehistoric and historic tribes left traces and indications of their cultures here in the so-called Ceded Area. Archeological findings included mainly temporary and minor activity sites but no durable or significant ones.

Historically, the Crows were the first of the modern Plains Indians to have migrated into the area but they found other places, particularly along the mountains and large rivers, more suited to their nomadic way of life. The Suhtai, predecessors of the modern Cheyenne, were reported to have used the area for a summer range when they migrated into the region.

The Crow Indians, however, traditionally claimed the area as part of the "Crow Country" by reason of discovery and occupation since about 1700. The Fort Laramie Treaties of 1851 and 1868 gave legality to this claim by including the region as part of the large area of land assigned to the Crow Tribe (over 38 million acres).

The Indian history in the area is not only vague but appears insignificant. No major inter-tribal battles, sieges, and other warlike events were recorded; nor were there important ceremonials and unusual events held here. Neither the Crows nor Cheyennes, first of the modern tribes to have come into the region, claimed any real or sentimental attachment to the Ceded Area. Throughout the inter-tribal war days (beginning in the mid-1700's after the tribes acquired the white man's horse and gun and ending about 1880), the area was used as a buffer zone between warring tribes.

This buffer zone was used mainly by the Crows and their enemies, the Sioux, Cheyennes, and Arapahos and occasionally by far-reaching Mandan, Assiniboine, Gros Ventre, and Blackfeet war parties. The remains of hill-top fortifications, lookouts, and temporary camp sites, are mute evidences of the buffer zone character of this area. These sites do not appear archeologically significant enough to warrant excavation. Destruction of these sites goes on constantly by "arrowhead hunters" and vandals.

Generally speaking, the archeology of the Ceded Area between the Yellowstone River and the present north boundary line of the Crow Indian Reservation, is little known. Archeologists have either ignored or taken little interest in this area prior to 1970 when coal exploration and impending strip mining operations became controversial.

A Department of Anthropology team of the University of Montana headed by Dale and Lynn Fredlund, under contract with Westmoreland Resources, Western Energy Company and Burlington Northern, made archeological surveys in the area in 1971 and 1972. These surveys discovered such sites as vision-quest cairns, rock art, small and temporary rock shelters and camp sites. No significant finds were made such as bison jumps, extensive occupation sites, or elaborate ceremonial structures up to this time.

The following are the presently known sites in the upper Sarpy Creek, particularly in Ts. 2 N., 1 N. and 1 S., Rs. 36, 37, and 38 E., where the Westmoreland Tract III lease is located. The Fredlunds initially located, confirmed reported finds, and assigned site identification numbers as follows:

24BH1070 - A cluster of 9 vision quest cairns on a high point overlooking Sarpy Creek valley near the old John Luther homestead.

24BH1071 - A small lithic materials area (rock flaking) but no artifacts.

24BH1072 - A small lithic materials area with few artifacts.

24BH1073 - A small lithic materials area with no artifacts.

24BH1074 - A small camp site with heavy concentration of lithic materials; 8 inch test pits produced several bifacial artifacts.

24BH1075 - A brief period habitation site, 300 by 25 foot area with few artifacts found.

24BH1086 - Temporary habitation site, 300 by 200 yard area, with scattered lithic materials.

24BH1728 - Habitation site with available water and concealment; flakes and artifacts found on surface. This site was excavated.

The above numbered sites are located predominately in the proposed Westmoreland mining area. Site 24BH1728 is located where mine facilities will be constructed. The distribution of the above sites indicated that at least a dozen more sites could be uncovered by mining excavations. To the east and south of the Ceded Strip are areas that had more desirable Indian settlement features. Archeological surveys have discovered numerous sites in these areas.

The following sites are located in upper Armell's Creek and the Colstrip area, which the Fredlunds also listed. They should therefore be used only as indicators of the types of sites that can be expected to be uncovered as mining progresses.

24RB1015 - Surface debitage along a terrace of a small creek.

24RB1019 - Rock art site consisting of 4 panels of petroglyphs on sandstone outcrop 25 to 30 feet high.

24RB1020 - Habitation and lookout site 100 feet above the art panels; quite a few artifacts found on surface and in test pits.

24RB1022 - Small concentration of debitage found intermittently along the base of a low sandstone outcrop; it may have been used as a hunting concealment.

24RB1033 - Rock shelter with nearby lithic area; also used in modern times.

PHYSICAL ENVIRONMENT

Air Quality

Air quality in the vicinity is normally excellent. The Montana State Air Quality Bureau sampled a rural area near Colstrip between April and September in 1972 for particulate matter.(3) The results are shown below.

Table 3. Particulate Measurements in Atmosphere near Colstrip, Montana

	Number of Samples	High Value	Low Value	Geometric Mean	Arithmetic Mean
Total suspended Particulates (24 hour average in $\mu g/m^3$) [1]	23	191	3.7	22	35.5

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[1] Micro-grams per cubic meter.

The Air Quality Bureau feels the values should be even lower during winter months so that the annual geometric mean will be closer to $15 \mu g/m^3$). The EPA secondary standard for particulate matter in the United States on an annual basis is $60 \mu g/m^3$ with a $150 \mu g/m^3$ 24 hour maximum. Sulfur dioxide and several trace elements measured in the area were similarly much less than the national averages or standards. However, it should be pointed out that during periods of drought, air quality does decrease drastically. Dust storms have lowered visibility to less than one mile in the area. Translated into particulate measurements, this would equal something like 500 $\mu g/m^3$.

While air pollution in the Ceded Area is not now a problem, the same cannot always be said for the points to which the coal will be shipped. The coal will be burned at power generating plants located throughout the Upper Midwest. Stack emissions from these plants presently pollute the air locally. As an example the sulfur content of the Illinois coal presently being burned is about 3.25 percent. To indicate the effect of burning this coal in just one area, Wisconsin Power and Light Company has stated that at its Cassville plant the sulfur dioxide emissions are 103 tons per day.

To meet the air quality standards set by the various state environmental agencies and EPA, the power companies state that the coal burned must have a sulfur content of less than 1.5 to 2.5 percent by 1975 (depending upon the plant and its location), or the plant must be rebuilt to include SO_2 removal systems. These systems are extremely expensive and have yet to be completely proven beyond the pilot plant stage. The companies have elected to blend the Illinois coal with low sulfur western coal. The coal from the Westmoreland mine has a sulfur content near 0.7 percent with the quantities of other undesirable elements similarly quite low as noted in Appendix 1.

Noise

At present, the hills around the Westmoreland leases are very quiet. While no noise measurements are available in the vicinity, simmilar areas have normal background sound levels below 30 decibels. The only noise that could be expected to break the stillness would be a car passing on the nearby road, or a natural happening such as a storm or high winds.

Land Resources

Tract III has 14,745 acres presently under lease to Westmoreland Resources. It is estimated that about 2,200 acres (15 percent) is cultivated; 8,400 acres (56 percent) is in native range, and the remainder is classified as timberland. Although the timber stands are sparse, the land produces good volumes of grass except in the densely timbered areas in the drainages.

In fulfillment of the existing sales commitment, the partnership will disturb 1,280 acres in 20 years. Although they have coal rights on the entire tract, they have obtained surface rights on only 6,000 acres from six former owners. They have acquired surface rights to another 2,280 acres subject to finalization of legal agreements and the remaining surface rights of Tract III will be obtained through continued negotiations.

Using an estimate of 3.5 acres per animal unit month, Tract III would produce approximately 3,584 animal unit months of grazing. This would provide forage for about 448 animal units on an eight-month grazing basis. Assuming an 85 percent calf crop, approximately 381 calves would be produced at an average valuation of $180 per calf. This would provide a gross income of about $68,580 per year from livestock grazed on Tract III.

The 2,200 acres of farmland in the tract is used primarily for grain and alfalfa production of which approximately half is used for hay production and the balance is used for winter wheat and other small grains.

Using an average of slightly less than two tons of hay per acre, approximately 2,000 tons of hay would be produced. Assuming that 536 tons of this hay would be needed by the livestock grazed on the tract, the remaining hay at a value of $30 per ton, would have a gross value of $49,920.

The remaining 1,100 acres is planted to grain which would yield about 30 bushels to the acre on summerfallow, producing approximately 16,500 bushels of wheat and other small grains. At an average price of $1.75 per bushel this would result in about $29,000 gross income from grain.

Estimated prices for the next five years were used based on projected historical trends.

In summary, it is estimated that the following gross annual income could be expected from agricultural production in all of Tract III:

Cattle production	$68,580
Hay production	49,920
Grain production	29,000
Total annual gross agriculture income	$147,500

It should be pointed out that mining in Tract III will not be in the lowlands of the major drainages where the greater portion of farmland is located.

The production levels from agriculture should not be altered appreciably in the next 20 years, since Westmoreland is leasing the grazing and agricultural land back to the ranchers at attractive rates.

Soils

The Soil Conservation Service recently made a soil survey, still unpublished, which indicated that there are eight soil mapping units in the initial mining area. Map No. 5 illustrates in color the capability classes of these soils and outlines the mapping units.

The following is a summary of the soils in the mining area by mapping unit and capability class:

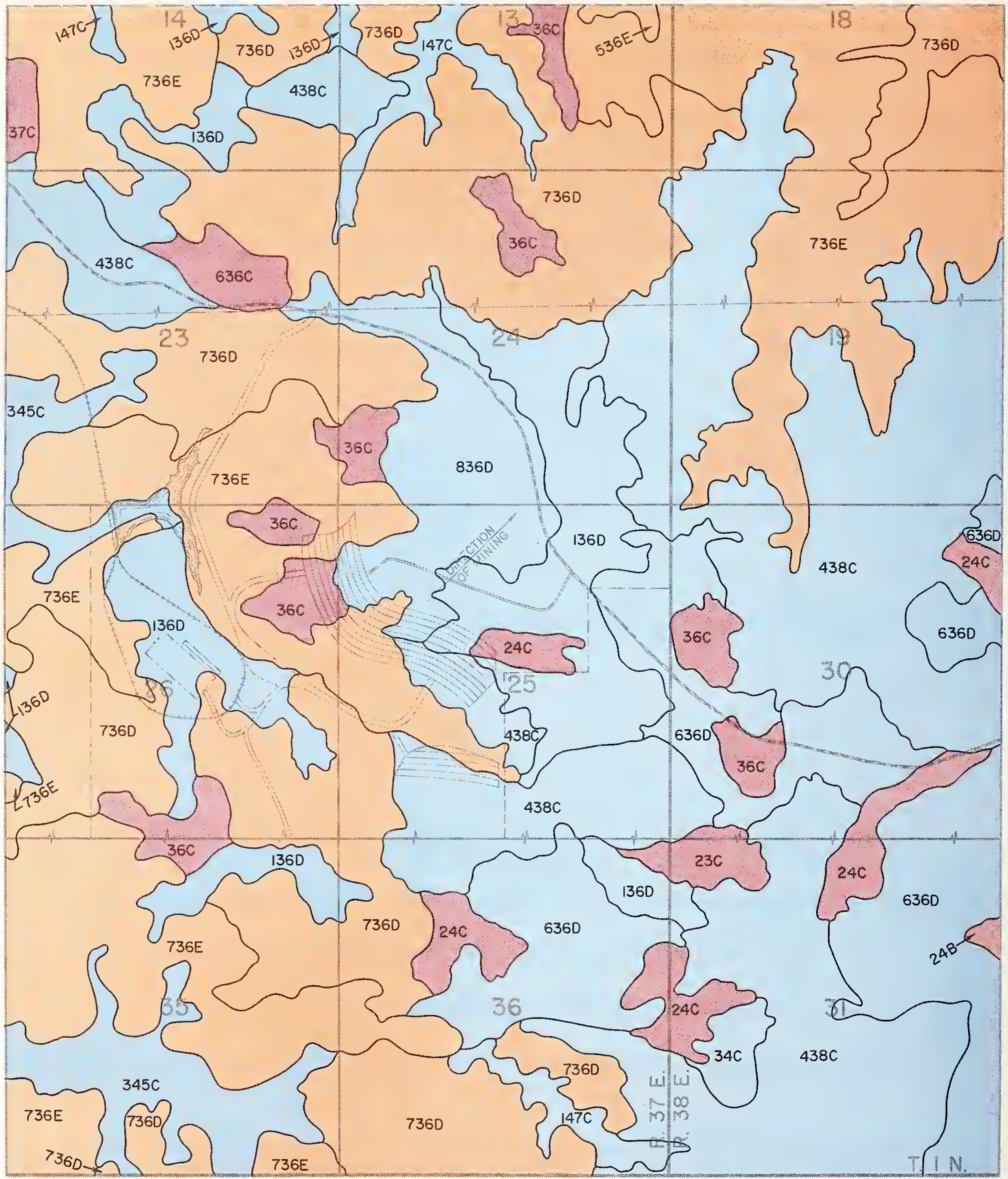
Mapping Unit 24C, Class IIIe-3 (red) - Fort Collins loam has 20 to 40 inches of A and B horizons. It is a medium-textured alluvial soil with a moderate permeability rate. It is used extensively for dry and irrigated farming and is a highly productive soil.

Mapping Unit 36C, Class IIIe-3 (red) - Thedalund-Cushman loams, 4 to 8 percent slopes - This mapping unit consists of a mixture

MAP 5

LAND CAPABILITY CLASSES

VICINITY OF MINING SITE



LAND CAPABILITY CLASSES EXPLANATION

None on this map	Soils in Class I have few limitations that restrict their use when cultivated.
None on this map	Soils in Class II have minor limitations that restrict their use. Easily applied conservation measures are needed when cultivated.
🟥	Soils in Class III have severe limitations and require special conservation measures when cultivated.
🟦	Soils in Class IV have very severe limitations, require intensive conservation measures and very careful management if occasionally cultivated.
None on this map	Soils in Class V have no erosion hazard. They are wet or subject to overflow. Their use is limited to pasture, range or wildlife.
🟧	Soils in Class VI have limitations that make them unsuited for cultivation. Their use is limited to range, woodland, wildlife or recreation. Seeding or reseeding is practical.
None on this map	Soils in Class VII have very severe limitations that limit their use to range, woodland, wildlife or recreation. Reseeding is generally not practical.
None on this map	Soils in Class VIII are not suited to agricultural production. They have value for wildlife and recreation.

LEGEND

736D	Soil Mapping Unit Symbol
∼	Soil Mapping Unit Boundary
▨	Westmoreland Mining Site Boundary

0 1,000 2,000 3,000

SCALE IN FEET

of Cushman soils which are moderately deep, medium-textured, and moderately permeable. They are used extensively for dry farming while the Thedalund soils, somewhat shallow clay loams are used primarily for range. This particular complex is suitable for farming when found in economically sized units. It is often used for grazing and produces good volumes of range forage.

Mapping Unit 136D, Class IVe-3 (blue) - Thedalund-Midway Complex, 8 to 15 percent slopes. This unit consists of a mixture of Midway soils which are shallow, moderately fine-textured, moderately slow permeability with a low water-holding capacity and Thedalund soil which is moderately deep and medium-textured with a moderate water-holding capacity. The complex is used primarily for grazing purposes as it is shallow and the erosion hazard is severe due to its slope. Included in the mapping are areas of Fort Collins loam in swales and shallow drainage ways. Small areas of cushman loam are included on smooth ridges having slope gradients of 4 to 5 percent.

Mapping Unit 345C, Class IVe-3 (blue) - Nunn-Midway silty clay loams, 4 to 15 percent slopes. This mapping unit contains a mixture of Nunn silty clay loam which is a suitable soil for farming while the Midway silty clay loam is not suitable. Due to the high incidence of the Midway and the topography, it is not recommended for farming and should be used for grazing.

Mapping Unit 438C, Class IVe-3 (blue) - Nelson fine sandy loam, 2 to 15 percent slopes. This soil is 20 to 40 inches deep developing in place from weathering sandstone. It is not suited to dry farming in a semi-arid climate due to its drouthy nature. It does produce good volumes of grass and is used extensively for grazing.

Mapping Unit 736D, Class VIe (orange) - Thedalund-Wibaux Complex, 8 to 15 percent slopes. This complex includes shallow, medium-textured soils used strictly for grazing. The Wibaux soil is usually very shallow, 5 to 10 inches deep developed over burned-out coal beds clinker in the Fort Union Formation. Little topsoil would be usable from this unit. The Thedalund soil as previously described is a somewhat deeper soil but the high incidence of Wibaux soils in this complex lowers the productivity of the range forage. Included in the mapping are areas of moderately deep spearman loam in smooth broad ridge tops and valley sides having gradients of 4 to 5 percent.

Mapping Unit 736E, Class VIs (orange) - Thedalund-Wibaux stony loam, 15 to 35 percent slopes. Due to the steep topography and high incidence of Wibaux soils, the unit is best suited for grazing purposes.

Mapping Unit 836D, Class IVe-3 (blue) - The Thedalund-Nelson Complex has 4 to 15 percent slopes. This complex produces high volumes of grass but would be unsuitable for farming due to its drouthy characteristics, steep topography and low water-holding capacity.

Additional information on present use acreages and suitability of A & B horizons for topsoiling can be obtained from Appendix A, or from the Soil Conservation Service Office in Hardin.

Vegetation

Tract III is represented by five principal vegetation communities. Table 4 shows their distribution over the tract and the immediate mining area. (4)

Table 4. Principal Vegetative Communities in Project Area

Vegetative Type	Tract III		Immediate Mining Area		Area of Disturbed Vegetation 1/
1. Grassland community	39%	5,751 ac.	59%	637 ac.	126 ac.
2. Timber community	39%	5,751 ac.	34%	367 ac.	34 ac.
3. Cultivated cropland (hay & grain)	15%	2,212 ac.	--	--	--
4. Dry hillside community	6%	884 ac.	6%	65 ac.	38 ac.
5. Streambank community	1%	147 ac.	1%	11	2 ac.
Totals	100%	14,745	100%	1,080 ac.	200 ac.

1/ Area planned for haul roads, railroad loop, coal loading facilities, etc.

A brief description of the five plant communities follows: [1]

The grassland community is the most extensive one on Tract III and the mining area, which includes both natural grassland and self-revegetated fields. Some of the latter have not been tilled since 1934-1936. The slopes range from nearly level to strongly sloping (up to 15 percent gradient).

The only trees are occasional Rockymountain ponderosa pine or Rockymountain juniper specimens. The shrub composition depends on soil and moisture conditions. Skunkbush sumac occupies the drier sites, western snowberry grows on the more moist sites, and silver sagebrush on sandy, well drained sites. Big sagebrush forms the shrub overstory in one area in section 26, T. 1 N., R. 37 E.

Warm-season grasses include little bluestem, big bluestem, sideoats grama, and plains reedgrass. Cool-season grasses include bearded bluebunch wheatgrass, prairie junegrass, blue grama, red threeawn, needle-and-thread, green needlegrass, and several species of bluegrass. Numerous forbs and half-woody species are present but occupy only a small percentage of the ground area. Some of the most common are western yarrow, fringed sagebrush, cudweed sagebrush, green sagebrush, Hoods phlox, broom snakeweed, and large salsify.

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[1] See Appendix B for an inventory of plant species and related information for Tract III and the rest of the Crow Ceded Area.

The timber community is characterized by pure stands of Rockymountain ponderosa pine ranging from dense doghair thickets to the more usual open and savanna-like stands and in age from young through medium-aged to over-mature. Limited increment borings of small-diameter pine indicated an age of about 60 years. An over-mature 18-inch-diameter tree was estimated to have an age of over 200 years.

The open stands have a well developed shrub understory consisting of western snowberry, skunkbush sumac, and Woods rose. The dominant grasses are Idaho fescue, sideoats grama, bearded bluebunch wheatgrass, and little bluestem. The presence of significant amounts of Idaho fescue seems to depend on the presence of a pine overstory. Forbs and half-woody plants in significant quantities include pussytoes, several clover species, creeping mahonia ("Orengongrape"), goldenrods, cudweed sagebrush, arrowleaf balsamroot, and vetch species.

Present use of forested areas includes grazing, wildlife, some recreation, minor use of timber by local residents, and occasional sales of timber by ranchers to lumber mills and loggers or both. This latter use has accelerated in recent years. Changes in future utilization of timber in this area in the absence of coal development would be minor as this is dependent primarily on lumber markets rather than coal development. There are approximately 18 million board feet on about 5,900 acres within Tract III; of this, about 6 million board feet are lands owned by Westmoreland.

Cultivated cropland includes areas of dryland agriculture with fallow in alternate years. The principal crops are winter wheat and barley. Occasional fields are sown to alfalfa, standard crested wheatgrass, or other perennial grasses for hay or pasture.

The dry hillside communities occupy xerophytic south- and west-facing slopes having gradients generally from 15 to 35 percent and shallow to very shallow soils developing on shale, siltstone, sandstone, and porcellanite (baked red shales).

The dominant plant species are bearded bluebunch wheatgrass, needle-and-thread, sideoats grama, and cheatgrass brome or other annual bromes, with scattered skunkbush sumac plants, and some pricklypear and small soapweed (yucca). Sixteen species of forbs and semi-woody plants make up a very small part of the vegetative cover. Moderate use is made by cattle. The range condition is fair.

The streambank community occupies the bottomland along the intermittent streams of the tract. The dominant species include an overstory of green ash and boxelder with occasional cottonwoods, especially northward in the Ceded Area; a shrub understory of mainly common chokecherry, western snowberry, American plum, Woods rose, silver sagebrush, hawthorn, clove currant, and willow; and a grass and forb layer of bluegrasses, foxtail, basin wildrye, sedges, clovers, cattails, bigsting (stinging) nettle, American hop, common dandelion, plaintain, docks, and western yarrow. The water table is commonly close to the surface in the bottomlands (within four feet).

Plant Succession Under Present Land Use. It appears that the native vegetation is in a fairly stable condition approximating the climax state, but occasional species such as annual grasses, dandelion, and other invader plants may make up a significant part of the plant cover. If mining were not carried out, overgrazing in high use areas and subsequent erosion could be the principal factor that would bring about a deterioration in the vegetative composition.

Formerly cropped areas that have been abandoned to crop use have returned to a grassland vegetation but with a much higher percentage of cheatgrass brome and certain forbs. Presumably the vegetation will eventually approximate a climax state, but certain desirable species such as bluebunch wheatgrass are extremely slow in reinvading a former habitat.

Wildlife

The abundance and distribution of all wildlife species is largely dependent upon existing habitat conditions. The habitat in turn is largely a product of the soil, precipitation, slope, aspect, and other interrelated factors.

The interspersion of the previously described vegetative types in this area provides good to excellent habitat conditions for a wide variety of wildlife species. A list of the more conspicuous game and non-game species is shown below. For a more detailed inventory of wildlife species present within the area, refer to Appendix D.

Big Game - From the standpoint of both numbers and hunting potential, mule deer are the most important big game species present in the area. The timber type provides not only an adequate supply of preferred forbs and shrubs but also an abundance of escape cover. A list of some of the most important forbs and shrubs in the area would include:

Skunkbush sumac
Rose
Snowberry
Chokecherry
Yellow sweetclover
Salsify
Wild lettuce
American licorice

Of the browse species listed, skunkbush sumac probably is the single most important species for mule deer. In one study in central Montana, Mackie found that browse comprised 51 percent of the summer diet and skunkbush accounted for 41 percent of this total.(6) Food habits of the deer seasonally change with snow depth and availability. In one study forbs accounted for 60 percent of the diet in June but decreased to 34 percent in August.(7) During the winter months, the same investigator found that browse species constituted 96 percent of the diet.

The project area described lies between hunting districts 720 and 72 as delineated by the Montana Department of Fish and Game. Deer production and survival counts conducted by the Fish and Game Department in 1970-71 are shown in Table 5.

Table 5. Deer and Antelope Production and Survival Counts

Species	Males	Females	Fawns	Density	Fawns/100 Females
Mule deer	9	49	44	-	90
White-tailed deer	1	3	2	-	67
Antelope	78	324	209	0.4	65

By the criteria established by the Fish and Game Department, these data generally indicate the mule deer in this broad area are in good condition. As might be expected from the low number of white-tailed deer counted, the proposed project area provides only limited or marginal habitat for this species and relatively few numbers are present.

Likewise, this area provides limited habitat for antelope. In a general aerial census of the hunting district in 1969, a total of 32 animals were counted in this area in July. According to Fish and Game figures, the antelope density in this general area is only 0.1 to 0.4 animals per square mile. This compares to figures of 3.5 and 1.3 animals per square mile in more suitable antelope habitat to the north in the Haxby and Snow Creek areas in Garfield County. Composition and production counts for antelope conducted by the Fish and Game Department in 1972 adjacent to the Wolf Mountains is shown in Table 5. The data indicate the antelope in this area are generally in fair condition.

Based on observations in the field, most of the key browse species (skunkbush, snowberry, rose, and silver sagebrush) appears to be in fair to good condition with few plants heavily hedged (form class 3-6), and only a moderate amount of decadence. No condition and trend browse transects, however, have been established within the project area.

Despite the apparent satisfactory browse condition, the observed lack of seedlings and young plants may indicate a possible downward trend.

Virtually the entire project area is privately owned and rather heavily grazed by domestic livestock. Cattle do compete for available forage during certain times of the year and evidence of their competitive use was observed in this area. Most of the observed competition, however, was confined to the level, more open grasslands and the stream bottom types.

Furbearers, Predators, and Other Mammals - The wildlife inventory was compiled from personal observations and from Fish and Game, Forest Service, and Bureau of Land Management records in or adjacent to the site and lists a total of 40 species other than those already mentioned.

This inventory includes a total of 11 furbearers (see Appendix D), and three predator species. Although the 11 species of furbearers inhabit the area encompassed within the project boundaries, their numbers are relatively few and are seldom trapped. The predator species (coyote, fox, and bobcat), depend upon other animals for their source of food and help to maintain an ecological balance. These species, however, occasionally prey on domestic livestock and game animals although their main source of food are the small rodents and rabbits that inhabit the area.

Game Birds - The project area provides some good to excellent habitat conditions for several upland game birds. Included in this category are sharp-tailed grouse, pheasants, gray partridge, sage grouse, and turkeys. Habitat conditions in the area favor pheasants and sharp-tailed grouse and there are probably greater numbers of these two species than of the others, although census and production figures for this specific area are absent. Fish and Game Census counts from surrounding areas show the following:

Table 6. Game Bird Counts

Species	Census Area	Method	Year 1971	 1970	 1969
Sage grouse	Colstrip	Dancing grounds (1)	Not counted	22	16
Sharp-tailed grouse	Colstrip	Dancing grounds (5)	84	103	99
Pheasants	Sarpy Creek	No. calls/2 min.	34	26	20

No census figures are available for partridge or turkeys, although few of either of these species occur within the project area. In 1957 a total of 17 turkeys (2 toms and 15 hens) were transplanted to the Sarpy Creek area from Long Pines (8) and a few birds are still occasionally seen in this area.

Perhaps the single most important habitat requirement for sharp-tailed grouse is undisturbed perennial grasslands interspersed with some brushy cover. Any disturbance, treatment, or reduction of this vegetative type will reduce the overall population of this species.

Sage grouse are largely dependent upon a sagebrush community for their food, nesting, and escape cover. One study in central Montana, however, indicated that forbs associated with this community comprised an average of 75 percent of the diet of juvenile sage grouse through 12 weeks of age.(9)

The remaining game bird species are more closely associated with the stream bottom vegetative type. In fact virtually all animals and birds in this area probably use this type at some time for food, cover, and water. These remaining bird species are also closely associated with cultivated crops. One Montana study showed that cultivated crops furnished 77 percent of the pheasants' diet.(8) Barley and wheat were the most important food items. Wild weed and grass seeds, green vegetation and animal matter contributed the remaining items in their diet.

Other Bird Species - Even more sketchy information is available for these species. The wildlife inventory was compiled from field observations, Forest Service, and Bureau of Land Management records.

Some of the more prominent bird species in this area with regard to abundance and distribution, would include magpies, meadowlarks, crows, robins, bluebirds, several species of sparrows, mourning doves, and sparrow hawks.

Large raptors also occasionally visit this area to hunt. A list of these species would include both the golden and bald eagle; turkey vulture, marsh hawk, and red-tailed hawk.

Waterfowl - This is not an important waterfowl area although a few individual birds were observed along Sarpy Creek and the East Fork of Sarpy Creek. These streams and ponds in the area have some water into July and undoubtedly a limited number of waterfowl and shorebirds are produced here. The predominant species observed were mallards.

Reptiles and Amphibians - A list of 14 reptiles and amphibians are included in the wildlife inventory. The most prominent of these species would include the rattlesnake, racer, and garter snakes, and several species of frogs. Most of these species are associated in some way with the streambank plant community or cattle watering areas.

Rare and Endangered Species - Although the prairie faicon has been observed in this area, this species has recently been removed from the endangered list and placed in the category "status undetermined." No peregrine falcons were observed but it is suspected that this rare species may be present or occasionally visit the area.

It is well known that the rare black-footed ferret lives on and is closely associated with prairie dog towns. No prairie dog towns, however, were seen within the boundaries of this proposed project and it is doubtful that black-footed ferret are present.

Fish - There are presently no waters on the mine property supporting fish life. However, downstream along Sarpy Creek (3½ miles northwest) and East Sarpy Creek (3 miles northeast) there are small populations of non-game fish species. Although both streams experience extremely low summer and winter flows and become intermittent, there is evidently enough water in the remaining deeper pools to support fish life the year round.

Fish species sampled by Montana Department of Fish and Game personnel at stations located below the mine property near the confluence of Sarpy and East Sarpy Creek included: Longnose sucker (Catastomus catastomus), Flathead chub (Hybopsis gracilis), and several small fish not identified except as belonging to the minnow family (Cyprinidae). Additional sampling stations located approximately 25 to 30 miles downstream near Sarpy Creek's mouth revealed the following additional species: Carp (Cyprinus carpio), White sucker (Catastomus commersoni), Green sunfish (Lepomis cyanellus), and Fathead minnow (Pimephales promelas). In addition, local fishermen report that channel catfish (Ictalurur punctatus) are caught in lower Sarpy Creek during the spring months. There are no known rare or endangered fish species in the Sarpy Creek drainage.

Local residents occasionally fish the lower sections of Sarpy Creek for catfish. The non-game species found in the upper sections of streams near the mine property are not utilized. Fisherman use of Sarpy Creek outside the project could not be expected to change very much. The limited drainage area and resulting low water flows would probably always produce an intermittent stream incapable of supporting game species in the upper sections.

Esthetics

Except for occasional fence lines crossing the ridges, the Westmoreland land retains its naturalness - an ageless, solitary land of rolling contours broken by steep banks and craggy,wooded hilltops. Its beauty is derived partly from its lonely, timeless state that stirs the senses and partly from its endless variety. Figure 1, in the Introduction, expresses the feeling well.

Recreation

The area has a considerable potential for certain types of recreation. It is relatively undisturbed and its hills and pine groves would make a fine setting for such diversions as camping, picnicking, hiking, or backpacking. In addition, deer could provide excellent hunting in the fall while wildlife enthusiasts could study the birds and animals year around.

At present, the potential is not being realized for two reasons. First, the land is privately owned and posted against trespassing. Thus the recreational use is limited to the property owners and those whom they may allow to use the land. It is possible for visitors to view the scenery from county roads that wind through the area but this is somewhat limiting. Second, the site is relatively isolated and an abundance of similar recreational areas exist in Montana. At present except for hunting there is no public demand on the area for recreation.

Geology

The massive Fort Union formation of Tertiary Age covers most of the eastern and southeastern portion of the Ceded Area.

Further north as the elevation drops into the Yellowstone River Valley, the Fort Union and underlying Hell Creek formations give way to the Bear Paw shale of Upper Cretaceous Age. Quaternary alluvium forms the surface geology along the major drainages.

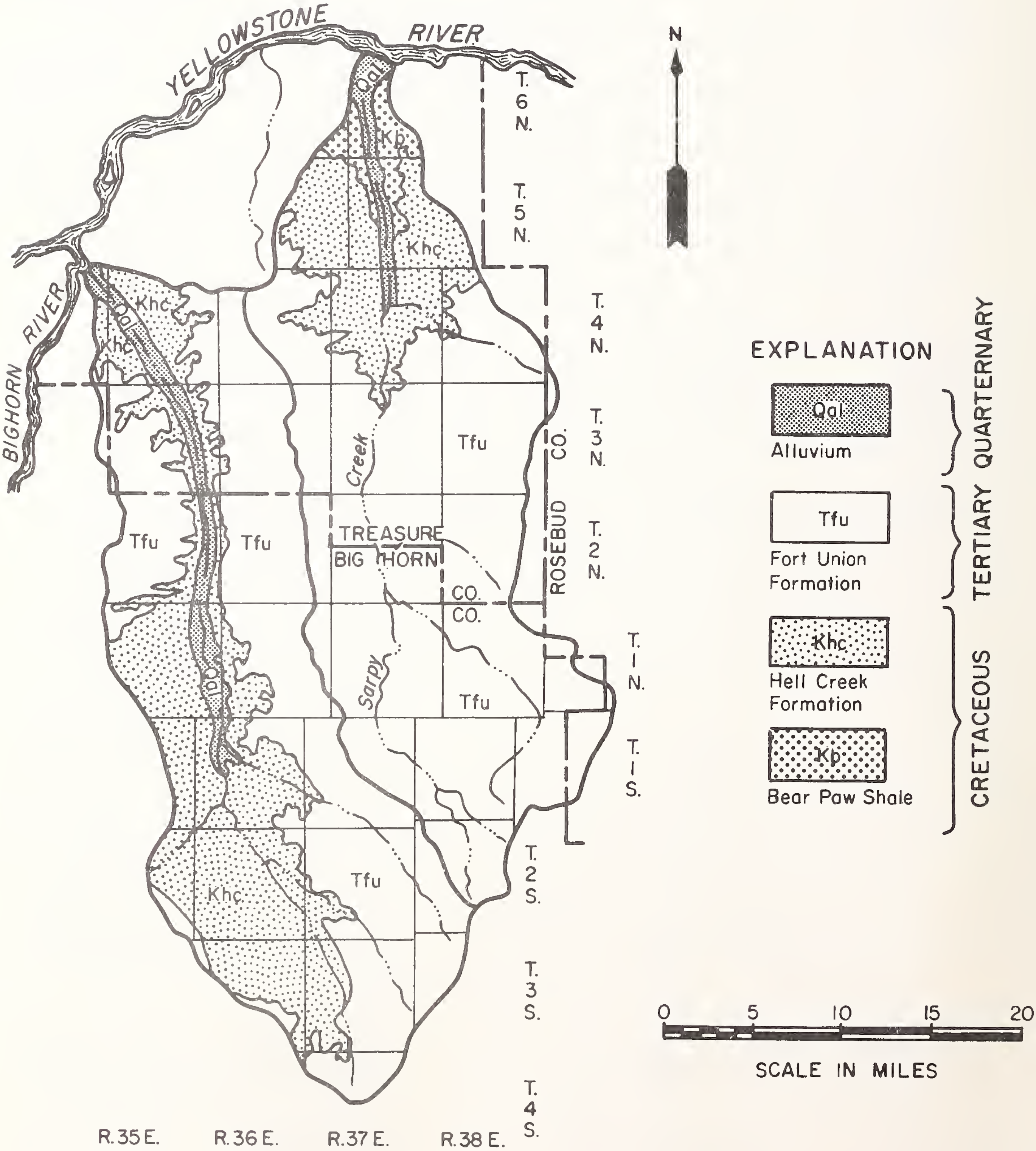
The upper subsurface strata within Ts. 1 and 2 N., Rs. 37 and 38 E., are dipping gently to the east-northeast. The surface of the entire lease is composed of the Fort Union Formation (Tongue River Member) of Tertiary Paleocene age. See Map No. 6 and Table 7.

Table 7. Table of Geologic Stratigraphic Formations

Geologic System	Group and Formation	Member	Lithologic Character
Quaternary	Alluvium		Clay, silt, sand, gravel and clinker.
Tertiary	Fort Union	Tongue River	Sandstone, shale and coal beds. Sandstone and shale are white to light gray in lower part, changing to yellow to buff in the upper. Outcrops of coal generally burned, producing red to lavender clinker beds. Member includes the Rosebud-McKay and Robinson coal beds.
		Lebo shale	Dark carbonaceous shale with a considerable amount of sandstone and lignite.
		Tullock	Alternating beds of yellowish gray to buff sandstone and shale with thin beds of coal.
Cretaceous	Hell Creek		Interbedded, massive, light brown to gray concretionary sandstone and dark gray to green shale.

MAP 6

GEOLOGY OF SARPY CREEK AND TULLOCK CREEK DRAINAGE BASINS

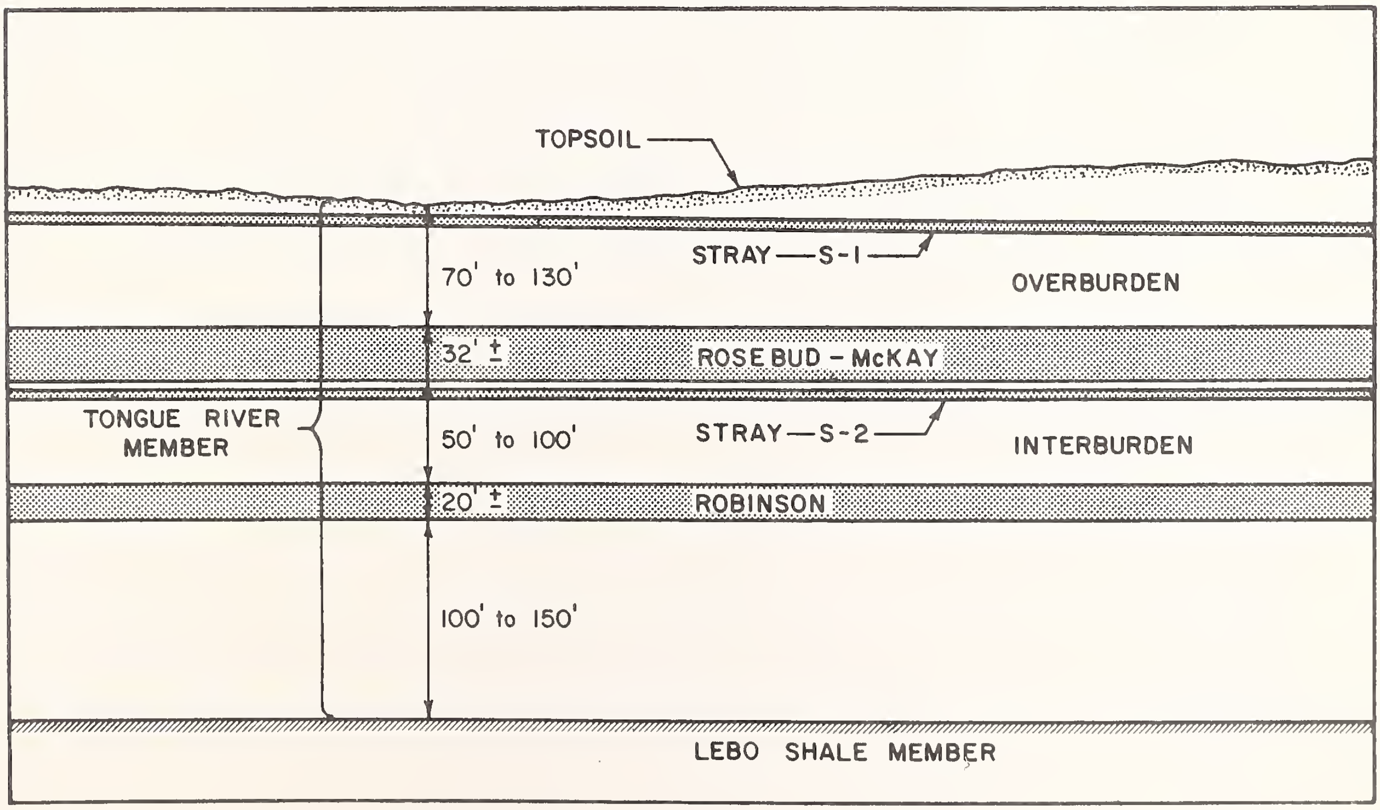


The Tongue River member of this formation makes up the majority of the surface while below it, the middle Lebo shale member crops out along the drainage pattern. The Tongue River is composed of light-colored clays, massive sandstones, and thick coal beds. Due to erosion, only the lower portion of the 1,650 foot thick member remains in this area. Two prominent coal seams remain. The Robinson (17' to 23') lies approximately 100 to 150 feet above the base of the Tongue River member. About 50 to 100 feet above the top of the Robinson is the base of the Rosebud-McKay coal seam which is 30 to 35 feet thick. The unnamed coal seams are present, both being three to five feet thick. One lies 20 to 30 feet above the Rosebud-McKay and the other 5 to 10 feet below. See Figure 5.

FIGURE 5

GEOLOGIC CROSS SECTION

OF LOWER STRATA IN FORT UNION FORMATION



The Lebo shale is composed os dark "badland" clays, with minor sandstones and local coal beds.(10) The "Big Dirty" coal bed lies at the base of this member.(11) These formations are underlain by a thick series of sedimentary formations ranging in age from Cambrian to Recent. Reference (10) goes into a detailed lithologic description of the upper geologic strata township by township.

Seismic or earthquake activity in this general area, as reported from "Earthquake History of the United States," by the Coast and Geodetic Survey, (12) has been very minimal since 1852 when record keeping began. Tremors were felt in the Sarpy Creek area during the Hebgen Lake earthquake of 1959. The occurrence of this quake in southern Montana, adjacent to the west side of the Yellowstone Park, was felt over an area of approximately 600,000 square miles.

Minerals

Coal - As stated previously, it has been estimated that Tract III contains approximately 625,000,000 tons of coal recoverable by strip mining methods. The quality of this coal is classed as sub-bituminous "B", having a fuel value of approximately 8,000 to 9,000 BTU's per pound.

The coal seams run low in sulfur (an average of 0.73 percent). This sulfur exists in the coal as free sulfur and as sulfides, (S^{--}). An inspection of the seams shows its sulfur content in the lower five feet and the upper five feet to run slightly above the 0.73 percent figure, while the coal in the center of the seam is lower in sulfur content. Coal (carbon) due to its reducing property (chemical affinity for oxygen) changes sulfate (SO_4^{--}) to sulfides (S^{--}). However, due to the high water content of the seam and its dissolved salts (sulfates of Na^+, Ca^{++}, Mg^{++}) deposit veins of calcium sulfate (Gypsum) were seen. Deposits of sodium and magnesium sulfates do not appear because of their high solubility. When the coal is mined, mixing of the coal from the various depths of the seam should bring the product to the sulfur average (0.73 percent).(13)

Oil and Gas - No oil or gas has been produced either on or in the immediate area of Tract III. The only oil and gas production in the vicinity to date has been found in the Snyder field, located in T. 1 N., R. 35 E. However, leasing interest continues to prevail in the region and in May 1973 requests for oil and gas lease advertisements were being received at the Crow Reservation Agency.

Other Subsurface Resources - As reported,(14) no commercially available quantities of metalliferous ore have been found in the eastern one-third of Montana. The predominant non-metallic resources on the subject tracts are some clays, sandstone, and clinker beds, all of which are economically of little value at this time.

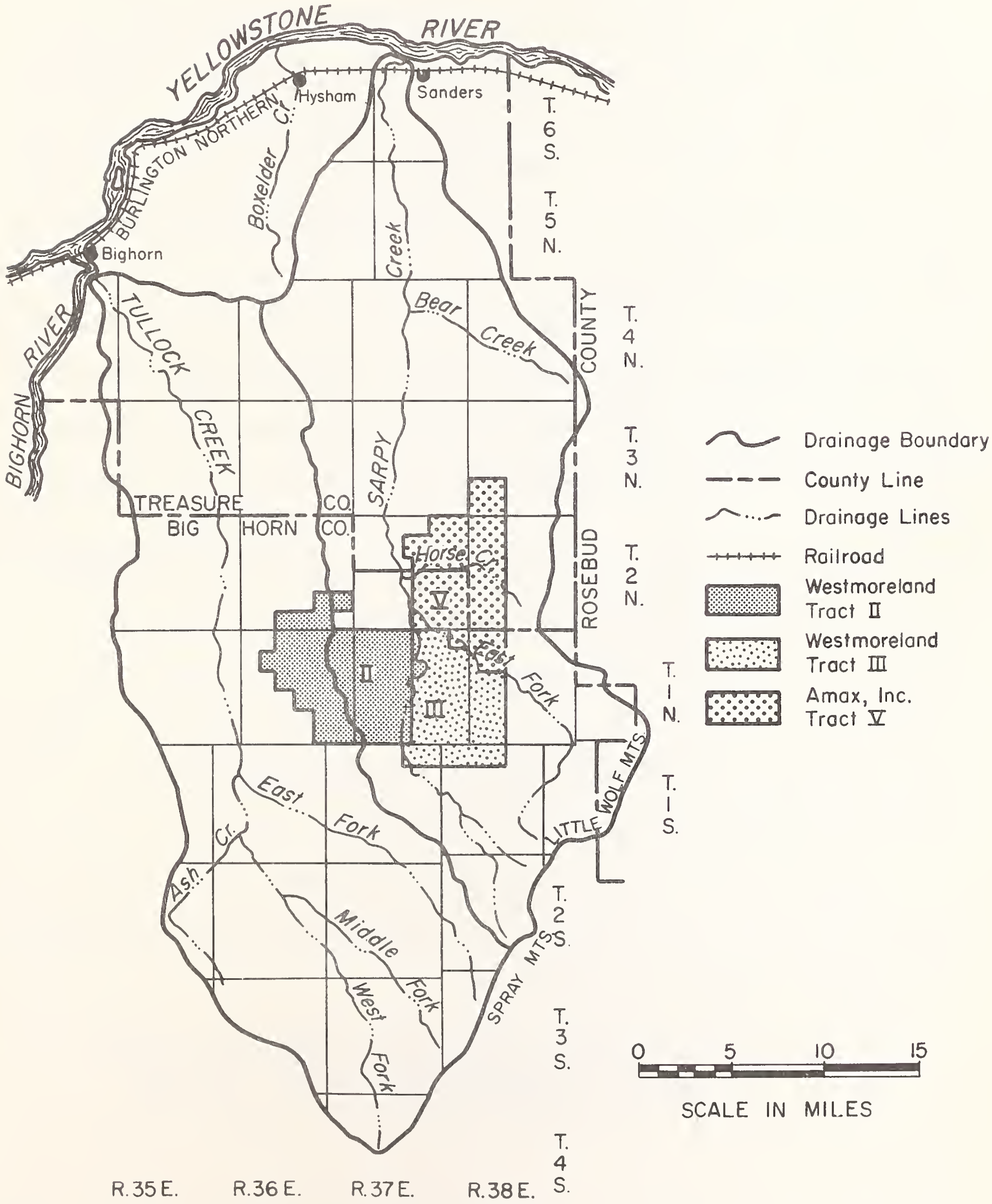
Surface Water Resources

Westmoreland Resources Tract III coal lease, comprising about 23 square miles, is situated south of and generally bounded by the confluence of Sarpy Creek and the East Fork of Sarpy Creek. Map No. 7 shows the drainage areas and other features of the Sarpy and Tullock Creek basins.

Average annual runoff per unit area, from precipitation, contributing to streamflow is approximately 0.25 inches.(15) The remainder of the precipitation falling on these drainages is lost to infiltration and evapotranspiration. A small percentage constitutes recharge to the ground water supply.

Streams and Ponds - Surface water supplies on Tract III are available only from ephemeral or intermittent streams and ponds. The tract is drained by local drainage patterns tributary to Sarpy Creek and the East Fork of Sarpy Creek. Spring Creek comprises the major local drainage for Tract III. Runoff from snowmelt or precipitation is generally present in the larger streams during the spring and early summer months. Streamflow normally ceases by late summer, although locally some small ponds remain throughout the year along the course of Sarpy Creek and the East Fork of Sarpy Creek. These ponds are maintained by underflow of ground water in the stream channel alluvium. Stock ponds constructed by private landowners are also present. In some instances small ponds or watering holes are maintained by natural spring flow or shallow ground water along the lesser drainages.

MAP 7
SARPY CREEK AND TULLOCK CREEK DRAINAGE BASINS



Water Quantity - Stream gaging stations have not been established on Sarpy or Tullock Creeks. Records on stream discharge measurements are therefore unavailable. Adjacent to Sarpy and Tullock Creek Basins, stream gaging stations exist on the Bighorn, Little Bighorn, and Tongue Rivers. A crest stage gage is located on the upper reaches of Rosebud Creek near Kirby, Montana. Streamflow records for these gaging stations are published in U.S. Geological Survey Water Supply Papers through the 1960 water year, and in annual reports on a state boundary basis for subsequent water years. The drainage basins of these water-courses (except for Rosebud Creek near Kirby) are much larger in area and attain higher elevations in their upper reaches than those of Sarpy and Tullock Creeks. These are major factors which contribute to the perennial flow of these streams.

The approximate magnitude of probable flood flow at the mouths of Sarpy and Tullock Creeks and several smaller drainage areas within the Sarpy Creek drainage are shown in Figure 6. Floodflow discharges having a recurrence frequency up to once in a 50-year period are depicted. These curves were derived from regional application data presented in U.S. Geological Survey Water Supply Paper 1679.(16)

Several general statements regarding surface water supply in the vicinity of Tract III are presented in the Westmoreland Resources report.(2) Of particular interest is the following:

> "An upper weathered mantle of silty soil or clinker beds covers most of Tract III and absorbs much of the snowmelt and precipitation. This retards or prevents surface runoff. In three spring seasons of observation, the surface has thawed suffici-

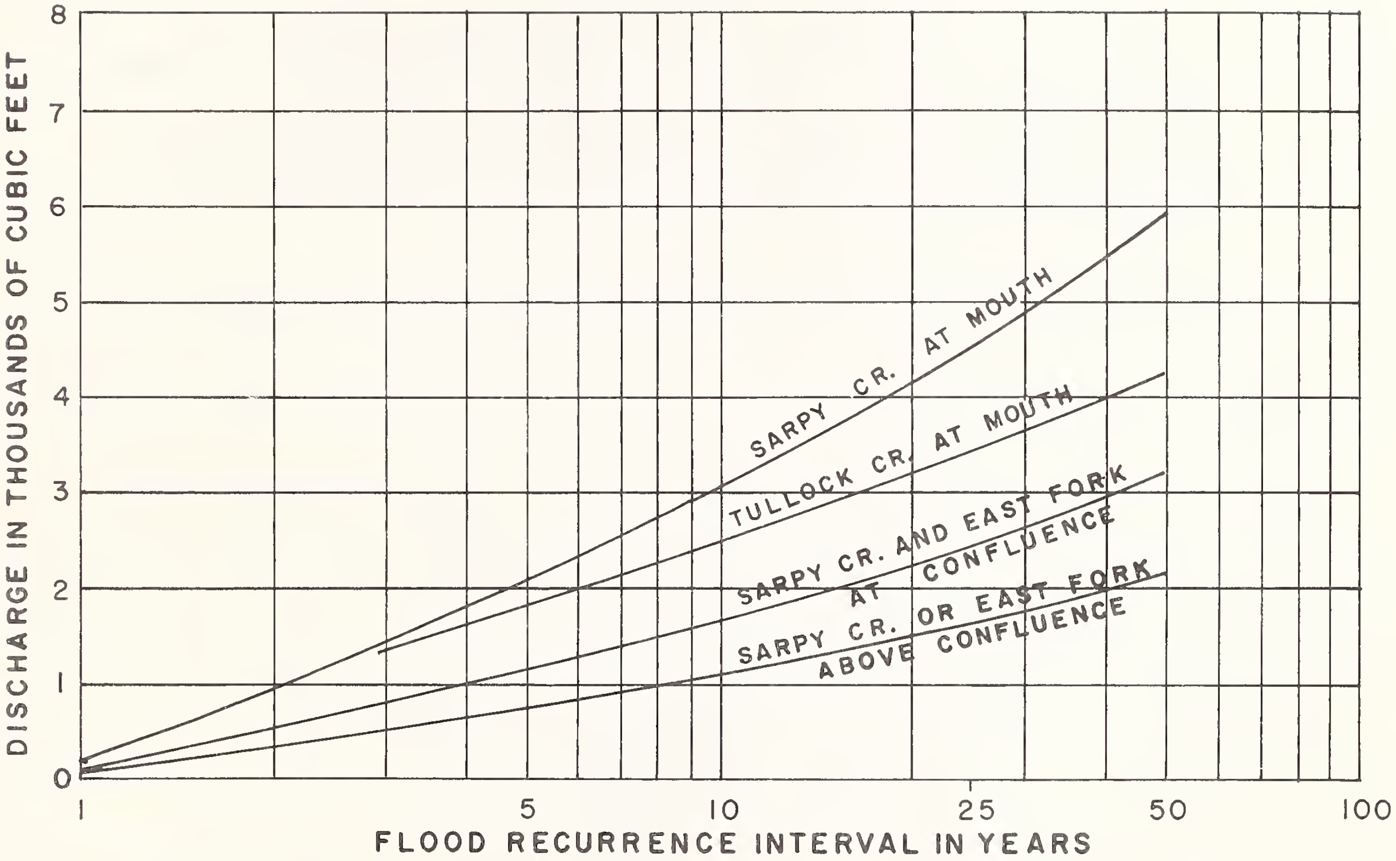


FIGURE 6

APPROXIMATE
FLOOD MAGNITUDES AND RECURRENCE INTERVALS
FOR
SARPY CREEK AND TULLOCK CREEK DRAINAGES

> ently to allow absorption, rather than major runoff. Heavy rains in the spring and fall are also mainly absorbed. Subsurface leakage is the dominant form of discharge. Consequently, the tract is not subject to excessive erosion.
>
> "In the spring, considerable runoff water does originate from the headwaters area of Sarpy Creek southwest of Tract III where the surface is the impermeable Lebo shale. East of Tract III, much runoff can be expected from the East Fork of Sarpy Creek headwaters area which lies along the front of the steep slopes of the Little Wolf Mountains."

Evidently, most of the soil groups in Tract III, and probably as a whole over the Sarpy and Tullock Creek drainage areas, exhibit moderate capacity to absorb water from precipitation and snowmelt. This observation is reinforced upon examination of the soil types outlined in the B.C. Research report,(4) which occur over Tract III, and their classification according to Soil Conservation Service criteria. A tabulation of hydrologic soil and mineral outcrop material is shown below.(17)

Infiltration Rate			
High	Moderate	Slow	Very Slow
Rosebud-McKay Clinker Material	Fort Collins Thedalund-Cushman Nelson Thedalund-Wibaux Thedalund-Nelson	Thedalund-Midway Nunn-Midway	None

Runoff from a drainage area is highly dependent upon land depressions and soil storage, land slope, vegetative cover, soil infiltration capacity, and time of rainfall concentration. The occurrence of very high rainfall concentrations within a short period of time over Tract III will undoubtedly contribute to floodwaters discharging via local drainages into Sarpy

Creek and its East Fork. Favorable soil infiltration conditions existing on Tract III, however, will preclude appreciable runoff until the initial infiltration storage capacity of the soil is exceeded and the basic soil infiltration rate becomes the predominant factor.

Water Development - Surface water supplies in the Sarpy and Tullock Creek basins are utilized mainly for agricultural purposes. Watering of livestock and wildlife, and irrigation of garden plots constitutes the typical usage.

Water Rights - The doctrine of prior appropriation for apportionment of water rights is practiced in the State of Montana. Under this doctrine senior appropriators have the prior right to irrigation water. Should shortages of water occur, the later rights must go without water as there is no prorating in times of water scarcity.(18)

Appropriation of the surface waters in Sarpy Creek drainage began in 1894, when a claim for 37.5 cfs (cubic feet per second) was filed by Michael Barrett. The most recent claim was filed in 1961, for an appropriation of 30 cfs from Spring Creek in section 16, T.1 N., R. 37 E. A total of 53 appropriations comprising a combined discharge of 740 cfs have been filed in the Sarpy Creek drainage. In the vicinity of Westmoreland Resources Tract III, on Sarpy Creek and East Fork of Sarpy Creek above their confluence, 13 appropriations totaling 193 cfs have been filed.
A complete tabulation of all Sarpy Creek drainage surface water appropriations is contained in the report prepared by Mr. J.L.Somers, A.R.A.(19)

From the foregoing, it is evident that the surface waters of Sarpy Creek drainage have been over-appropriated. Since the natural flow of water in Sarpy Creek comprises such a small proportion of the total appropriations during most of the year, no major irrigation development on the land has occurred.

Water Quality - Published data on water quality for streamflow in Sarpy Creek and Tullock Creek is not available. Nearby, water quality sampling stations of the U.S.Geological Survey are located on the Bighorn and Tongue Rivers. Records of suspended sediment yields and chemical quality of runoff for these stations would not be applicable to either Sarpy or Tullock Creeks.

Sediment yield from a particular drainage area is dependent mainly on the following: geology, topography, soils, type of erosion, climate, runoff, ground cover and land use. All of these factors are important to one degree or another in determining the actual yield of sediment from drainages. Several generalized studies of sediment yield have been compiled which show the general range in yield that may be anticipated from the Sarpy and Tullock Creek drainages.

The Missouri River Basin Comprehensive Framework Study(20) indicates an annual sediment yield range over the Ceded Area of from 100 to 400 tons per square mile per year. Conversion of these values to acre-feet of sediment results in a range of 0.07 to 0.28 AF/SM/YR,[1/] assuming a conversion factor of 1,416 tons per acre-foot. These values are applicable only to drainages larger than 100 square miles in area.

[1/] Acre Feet per Square Mile per Year.

Investigations of erosion and sediment transport indicate that sediment yield per unit area increases as the drainage becomes smaller, ranging as high as 50 to 75 percent of the material eroded (base sediment yield) for areas less than one square mile.

Unpublished data compiled by the USDA, Soil Conservation Service for the Wind, Bighorn and Clarks Fork River basins gives a general range of base sediment yield for drainages less than one thousand square miles in size based on land use or topography as shown below:

Typical Conditions	Base Sediment Yield (AF/SM/YR)
Mountainous	0.05
Farmland or valley bottom land	0.05-0.2
Rangeland	0.2-0.5
Eroded rangeland	0.5-1.0
Extremely high yield area	1.0-3.0

These base sediment yield values must be adjusted for the size of drainage area to obtain the actual sediment delivery rate at the location of interest. Actual sediment yield would range from a maximum of 71 percent, over one square mile, to about 38 percent of the base sediment yield over one-thousand square miles.

The above relationship is also considered to be applicable to the Sarpy Creek drainage as it lies adjacent to the area of investigation.

Due to the paucity of chemical quality of water data for runoff in Sarpy Creek a sampling program was initiated on October 8-10, 1972 by B. C. Research of Vancouver, Canada.⁽⁴⁾ Several of the sampling locations and results of the water quality investigations are shown in Tables 8 and 9.

Table 8. Sarpy Creek Sampling Locations

Sample Description	Location	Remarks
East Sarpy	Below East Sarpy Bridge	Water hole contained fish (cyprinids and suckers)
Main Sarpy No. 1	300 ft. above confluence of Main and East Sarpy Creek	Water sampled from pool, no surface flow at this point.
Main Sarpy No. 2	Above old ranch headquarters, NE¼NE¼, section 28, T. 1 N., R. 37 E.	Creek not running; sample taken from pool.

In summary, the B.C. Research report concluded that in Sarpy Creek the surface "Waters were alkaline (pH 7.9-8.4), highly colored, slightly turbid, very hard, and high in dissolved solids, indicating a high concentration of dissolved salts. Probably because of low flow, suspended solids were only moderately high."

Sources of information on the water quality in Tullock Creek are not available. Since the proposed Westmoreland Resources project will affect only the Sarpy Creek basin no further investigation was pursued for Tullock Creek. However, conditions similar to those existing on Sarpy Creek would be anticipated due to drainage basin similarities.

Table 9. Chemical Analyses of Sarpy Creek Waters

Parameter	East Sarpy	Main Sarpy No. 1	Main Sarpy No. 2	Recommended U.S.P.H.S. Drinking Water Standards
pH	8.4 (8.3)[1] ((8.2))	8.1 (8.3) ((8.0))	7.9 (8.1) ((8.2))	- - -
Color (units)	30 (40) ((40))	30 (50) ((40))	90 (45) ((30))	15
Turbidity	2.2 (17.0) ((3.7))	0.45 (8.5) ((7.6))	7 (3.9) ((3.9))	5
Hardness as $CaCO_3$ (mg/l)	1,125 (1,387) ((1,632))	1,835 (1,187) ((1,854))	1,095 (1,040) ((1,668))	- - -
Specific conductance (mmhos/cm)	2,433 (3,300) ((4,080))	4,493 (2,900) ((4,880))	2,433 (2,400) ((4,350))	- - -
Total solids (mg/l)	- - - (3,236) ((4,318))	4,453 (2,540) ((5,068))	2,048 (2,050) ((4,376))	- - -
Dissolved solids (mg/l)	2,260 (3,032) ((3,755))	4,523 (2,350) ((4,518))	2,025 (1,920) ((3,918))	1,000 [2]
Suspended solids (mg/l)	- - - (36) ((5))	20 (4) ((11))	23 (4) ((3))	- - -

---

[1] Values in parentheses are for samples collected on April 27, 1973; values in double parentheses are for samples collected on July 17, 1973.

[2] Maximum concentration desirable. 500 mg/l recommended.

Surface water chemical quality may improve considerably during periods of runoff, particularly in the spring when snowmelt water is available. The analyses presented in the B.C. Research report would be more indicative of the low flow conditions or of ground water quality present in the alluvial aquifer along Sarpy Creek. Periodic sampling of the surface waters along Sarpy Creek and East Fork of Sarpy Creek is being done by Westmoreland. Chemical analyses for samples collected during April and July 1973 are also shown in Table 9. Several additional sampling stations are also being monitored by Westmoreland Resources.

Ground Water

General. Descriptions of the geologic formations underlying the Westmoreland property and their hydrologic properties are contained in numerous publications of the U.S. Geological Survey and partially summarized in the geological section of this Chapter. Although these reports were written mainly for nearby areas, portions may be applied to these tracts. The data applies generally to both the Sarpy and Tullock Creek drainage basins. The approximate thickness, lithologic character and water supply capabilities of the stratigraphic units are described in Appendix E.

The regional dip or slope of the bedrock formations in the Sarpy and Tullock Creek drainages is generally east-northeast. The older formations crop out in the Tullock Creek drainage, while progressively younger formations are encountered at the surface to the east. The regional dip varies from three to five degrees.

An adequate analysis of the ground water resources which occur on Westmoreland Resources Tract III requires a more detailed presentation of individual aquifer systems. In particular, the coal bed aquifers of the Tongue River member are described in the following paragraphs.

Rosebud-McKay Overburden - This formation comprises an aquifer only in the uplands towards the southeastern corner of Tract III. The aquifer consists of a thin coal bed which is present to the east of the Rosebud-McKay burn along Sarpy Creek. This coal bed is separated from the Rosebud-McKay beds by interburden which ranges from 15 to 75 feet or more in thickness, decreasing from west to east. Recharge is supplied by seepage of precipitation into the formation outcrop, over the Rosebud-McKay clinker areas. This aquifer is localized and considered to be of minor importance.

Rosebud-McKay Coal Beds - The Rosebud-McKay aquifer occurs mainly over the eastern half of Tract III. It is comprised of two coal beds having a combined thickness of approximately 30 to 35 feet, and separated by a thin shale bed. The geologic structural high which trends north-south through the center of Tract III influences the aquifer potentiometric surface (water table) by confining the occurrence of formation saturation mainly to the east side of the structural high. Due to the location atop this trend, part of the coal beds in sections 25 and 26, T. 1 N., R. 37 E., in the proposed mine area are dry. To the west the potentiometric surface slopes toward points of spring discharge. On the east the surface slopes to the north where discharge points occur along the topography overlooking the East Fork of Sarpy Creek. The above is depicted by the ground water potentiometric surface map, prepared by the Montana Bureau of Mines and Geology.(2) Recharge of the coal beds occurs mainly to the south of Tract III from seepage of precipitation and runoff over the coal bed outcrop. The aquifer is considered to be of minor importance in the vicinity of Tract III.

Robinson Coal Bed - The Robinson Coal bed which is approximately 20 feet in thickness is present over most of Tract III. Artesian ground water conditions occur in this aquifer. The ground water potentiometric surface (2) is affected greatly by the structural high in Tract III. A pronounced north-south trending ground water divide occurs along this high. The potentiometric surface, sloping westward from the divide supplies water to small springs along the base of the formation outcrop. On the east side of the divide the surface slopes rather steeply to the east-northeast. Some of the water in this stratum may discharge, through spring flow or percolation, into the alluvium of East Fork of Sarpy Creek. However, hydraulic continuity with the aquifer system northeast from the East Fork of Sarpy Creek probably occurs. Recharge to the Robinson Coal bed aquifer is supplied by seepage of preciptation and runoff over the formation outcrop.

Lebo Shale Aquifer - This aquifer is comprised of a thin coal bed at the base of the Lebo shale or top of the Tullock member. The aquifer is completely buried by younger formations over the limits of Tract III.

Tullock-Hell Creek Aquifer - The combined Tullock member-Hell Creek formation aquifer is comprised of a thick section of silty sandstone and shale beds. Westmoreland drilled three test holes from 90 to 180 feet into the Tullock Member, in an attempt to develop an adequate water supply for the mining operation. An insufficient supply of water was obtained from this drilling program. Subsequent examination of geophysical data (electrical logs) from deep exploration test holes located off Tract III, has indicated the deeper water bearing sandstones may also be marginal producers.

Deeper Aquifers - Several artesian aquifers lower in the geologic section, in particular the Cloverly formation (which includes the Lakota sandstone) and the Madison limestone, are capable of supplying large quantities of water to wells where favorable conditions in the formations occur.

Water Quantity - Records of wells and springs presented in Appendix F were tabulated from data collected by the Montana Bureau of Mines and Geology.(21)

Well production figures less than 10 gpm (gallons per minute) would seem to be representative of the aquifers in the Tongue River, Lebo shale and Tullock members of the Fort Union formation. Well production was estimated from bailing or air lift tests and owners' reports. Instances where these figures exceed the average well production in the tables by a factor of three or more are probably optimistic. Maximum discharge from spring flow in the Rosebud-McKay and Robinson coal beds generally does not exceed several gpm.

No aquifer test data for these wells is available as controlled pumping tests were not conducted. However, aquifer constants for the Fort Union formation derived from pumping tests conducted in other areas

(Southern Powder River and Decker Montana areas) by the U.S. Geological Survey and the Montana Bureau of Mines and Geology are available.(22-23) The approximate range in transmissivity (ease of flow) obtained from these tests varies from 500 to 1,000 gpd/ft (gallons per day per foot). An estimated aquifer storage coefficient of $1x10^{-4}$ is considered representative. These values indicate fairly low productivity and are probably representative of confined artesian conditions in the aquifer(s).[1] [2]

Well production available from the combined Tullock Member-Hell Creek formation aquifer could range from 5 to as much as 50 gpm, depending upon the thickness and character of the sandstone and coal beds present. In the Sarpy Creek area, well production would tend to be in the lower portion of this range. The range in transmissivity from aquifer tests conducted on the Hell Creek formation in the southern Power River area was 1,500 to 4,700 gpd/ft. A storage coefficient of $4x10^{-4}$ was estimated. These values are also representative of confined artesian conditions.[2]

Well pumping test data for deeper geologic formations present on Tract III that may be classified as capable aquifers is tabulated in Table 10 below.

Table 10. [2] Pumping Test Results (24)

Aquifer	Well Location	Coefficient of Transmissibility-gpd/ft.	Storage Coefficient
Parkman sandstone	T.3 S.,R.35 E.,Sec.18	6,000	--
	T.6 S.,R.35 E.,Sec.13	20,000	$5x10^{-4}$
Cloverly formation	T.6 S.,R.35 E.,Sec.21	3,000	--
Madison limestone	T.9 S.,R.53 E.,Sec.22	90,000	--

[1] A confined artesian aquifer is an aquifer under a hydraulic head sufficient to raise the non-pumping water level in a well above the top of the aquifer. Where the land surface is lower than the level of this hydraulic head, a flowing or artesian well may be developed.

[2] Since the transmissivity and storage values in these paragraphs and Table 10 were obtained from information on areas outside of Tract III, they can only be considered as indicative of aquifer conditions until on going Tract III investigations provide data that is representative.

It is evident from the above data that the Madison limestone can be a profile water producing formation. Limestone solution features and fractures in the formation are the main contributing factors. A deep well was recently completed in this aquifer by Westmoreland Resources. The well is capable of producing an artesian flow of about 60 gallons per minute.

Water Quality - The general quality of the ground water present in the shallower aquifer formations is outlined in Appendix E. Partial chemical analyses for individual wells and springs on or near Westmoreland Resources Tract III are shown in Appendix F. These data were derived from analyses of water samples collected by the Montana Bureau of Mines and Geology.(21) Examination of the data indicates the following generalities:

(1) With one exception, all of the analyses indicate that the water is extremely high in hardness. The analysis lowest in hardness is for a well in the Lebo shale-Tullock member aquifer.

(2) Varied water quality is present in the alluvium along the major water courses.

(3) Water quality in the Rosebud-McKay overburden and coal seam aquifers includes high Ca^{++} (Calcium) and Mg^{++} (Magnesium) concentrations in the form of compounds of $CaSO_4$ (Calcium Sulfate) and $MgSO_4$ (Magnesium Sulfate).

(4) High Na^+ (Sodium) as Na_2SO_4 (Sodium Sulfate) and $NaHCO_3$ (Sodium Bicarbonate) are present in water from the Robinson coal seam aquifer.

(5) Water in the Lebo shale-Tullock Member aquifer is high in Na_2SO_4 (Sodium Sulfate) and $NaHCO_3$ (Sodium Bicarbonate). The sodium adsorption ratio (SAR) of this water is generally excessive.

(6) Lowest total dissolved solids occur in the Rosebud-McKay aquifers. The highest occur in the alluvium and Lebo-Tullock aquifers.

(7) Fe (Iron) is found in the ground water, probably in association with sulfur in iron sulfide.

The specific quality of ground water in many of the deeper aquifer formations on Tract III is unknown. However, it is probable that the Parkman sandstone and Cloverly formation contain slightly brackish water having predominant concentrations of sodium bicarbonate and sodium sulfate. The high salinity and sodium hazard precludes use of this water for agricultural pruposes. The Madison limestone aquifer contains ground water of fair to poor chemical quality for potable use (see Appendix F). Calcium sulfate is the principal chemical constitutent of the water. Although this water has a high salinity hazard it may be utilized for agricultural purposes on soils of good permeability. Domestic users may require acclimation to minimize cathartic effects. Excessively high ground water temperatures can be anticipated from these aquifers. Concentrations of iron and hydrogen sulfide may also be present.

Water Development - Ground water from the shallower aquifer formations is used mainly for domestic and agricultural purposes in the Tullock and Sarpy Creek drainages. Agricultural usage consists of watering livestock.

Water Rights - Appropriation of ground water for beneficial use prior to January 1, 1962 is recognized as a water right in the State of Montana. However, surface water rights prior to that date take precedence over all prior or subsequent ground water rights. Subsequent appropriative rights for ground water relates to the quantity of water for beneficial use. Household domestic use is excepted. Westmoreland Tract III is not situated in a controlled ground water area.(18)

A complete tabulation of water rights filed for ground water on and in the vicinity of Westmoreland Resources Tract III is contained in the report prepared by Mr. J.L. Somers, ARA.(19) These filings total 18 springs and 31 wells. Numerous other wells and springs in the vicinity have not been filed on.

Existing Pollution Sources

General. Existing sources of pollution which may contribute to contamination of water supplies in the area under consideration are as follows:

(1) Surface Water
  (a) Sediment and organic material contributed by runoff.
  (b) Livestock and household wastes.

(2) Ground Water
  (a) Generally none. However, possible contamination from livestock and household wastes may occur in some instances. High or excessive nitrate (NO_3) concentrations, indicative of contamination, were noted in the chemical analyses of water samples from three wells and one spring. (21)

CHAPTER III

ENVIRONMENTAL IMPACTS

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HUMAN ENVIRONMENT

Employment and Income

The opening of the proposed Westmoreland coal mine in Tract III of the Ceded Area will have a primary impact on Big Horn County with lesser effects on Treasure County and the City of Billings, the nearest major population center. Since no company town is planned, living accommodations for the mine work force will be mostly in surrounding towns such as Hardin, Lodge Grass, Crow Agency, and Hysham as well as the various rural communities.

The eventual direct employment of 90 workers at the mine, together with the administrative staff of Westmoreland at Hardin and Billings, will provide stable employment in a basic economic sector. In addition to the mining jobs, a number of associated jobs will be created by Burlington Northern Railway operating and maintenance crews (crew changes will be at Forsyth and Glendive). There will also be additional economic activity created during railway spur line construction and mine-site development. The multiplier effect of the basic employment will further expand the employment picture in the local area and the southern part of Montana. Since Big Horn and Treasure Counties do not have a complete array of services, the employment multiplier for these two counties is estimated to be no more than two; that is, an increase of one worker in a basic industry will add one additional worker in support industries.

However, the more usual employment multiplier of 2.7 for Montana (Montana Department of Planning and Economic Development Studies) will still be felt in the larger geographical region including Billings (that is, another 0.7 of an employee will find an associated job somewhere in southeastern Montana, but outside the boundaries of Big Horn and Treasure Counties, as a result of each new mining job). Furthermore, still more "multiplier" jobs will become available at distant supply and consumption points, possibly bringing the total multiplier up to 3.5.

The employment impact on the Crow Indian work force will be even greater than for the area as a whole. An agreement between the Crow Tribe and Morrison-Knudsen Company, Inc., the mining contractor, assures that preferential treatment will be given the Crow Indians in job placement. Under this agreement, the Crow Tribal Council will assist in the recruitment and placement of the members of the Crow Tribe who desire work with the mining contractor and who are capable of filling the job openings.

To more fully develop the capabilities among potential Indian mine workers, Morrison-Knudsen Company, Inc., has developed an innovative approach to training which they have termed PINTO (Pilot Industrial Native Training Opportunity). After selection by the Tribe and Morrison-Knudsen management, the trainees are given job orientation, supervisory-human relations training, and job-related education before actually entering the on-the-job training program. The training program includes continuing education and training to develop a sense of responsibility among the Indian work force. A program of counseling for the trainees will be carried out jointly by the Tribe and the mining contractor.

The success of the Morrison-Knudsen training program is evidenced by their present Indian employment record. During the present (May 10, 1973) phase of dragline assembly and site preparation at the Westmoreland site, Crow Indian employment accounts for 68 percent of the total on-site employment or 36 out of 53.

Long-range employment opportunities for Indians at the mine appear favorable. In view of the Morrison-Knudsen record of successful training and employment of Indians at Crow and other reservations, it is safe to estimate that substantially over 50 percent of the positions at the mine will be filled by Crow Indians. There will be a time period during the early stages of mining that the percentage of Indian employment will be lower, since certain critical skills will need to be brought into the area. Later, as the Indian training program develops a responsible workforce, the Indians will move into openings created by workforce turn-over and by future expansion of the mining operation.

The projected employment at the mine site is 90 when full scale mining is realized. Indian job placement at 45 (one-half of total employment) will create approximately $700,000 of direct payroll income for the Crow Tribal members at 1973 semi-skilled wage rates. The Indian wage rate will tend to move upward as their skill levels increase. Non-Indian direct mining wage income will slightly exceed that for the Indian workers for a combined total of approximately $1,500,000 annually.

Royalty income from coal to the Crow Tribe is estimated at $700,000 annually based on a mining rate of 4,000,000 tons per year. Since the

Crow Tribe presently has an annual income of about $700,000 the royalty payments will approximately double the Tribe's annual earnings.

By combining wage and royalty income, the Crow Indians can expect to earn $1,400,000 annually from the Westmoreland operation and the non-Indians, $800,000. The application of an income multiplier of 1.9 to the total of Indian and non-Indian direct coal income will result in a near doubling of direct mining income for the local two county area, totaling $4,180,000. A further impact of about $1,320,000 should accrue to the remainder of southeastern Montana, including Billings.1/ These income multiplier effects will probably increase as more complete service and supply sectors develop locally.

There will also be some additional economic impact from direct operational expenditures by the coal mining contractor. The effect of these operational expenditures on the local economy will depend on the degree to which these specialized service and supply inputs for the coal mining operation are available within the area. In any case, they constitute a very substantial portion of the total multiplier effect.

Social Effects

The increase in local income from mine employment and from increased economic activity in the secondary economic sectors, together with the in-

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1/ The same multiplier cannot be used for employment and income because the service industry payscale in Montana is lower than the anticipated wage rate for the direct mine employment. The employment multiplier that was used was 2.0 locally and an additional 0.7 for the remainder of southeastern Montana; the income multipliers were 1.9 and 0.6.

flux of a few workers to fill the critical skill positions, will almost certainly change the local rural culture to a slight to moderate extent. The change, of course, need not be considered negative but some extent of change is inevitable when an industrial economic sector is superimposed upon an agrarian economy. The extent and effect of the cultural change depends to a large degree on the manner in which the Tribe uses or distributes the Tribal income derived from coal royalties. Other influencing factors on thecultural change are the location of the secondary services and the new residences. If these are located at or near the mining site in the rural setting, they will have a substantial effect on the existing culture; if, on the other hand, they are located at existing population centers, the effect on the local culture will be much less severe.

The location of the secondary services and new residential areas at existing population centers, Hardin for example, will have an impact on the utility, public service, and transportation systems to these towns and cities. Sewer, water, street, and utility requirements will increase.

Displacement of ranchers living in the mining area will be minimal. In purchasing the surface rights, Westmoreland has included an agreement permitting the ranchers to continue the grazing use of the land until mining takes place and again after reclamation and revegetation.

Transportation

Major changes can be expected in the road system within the area. Already Morrison-Knudsen Company, as contractor to Westmoreland Resources, has built a temporary access road into the mining site on Tract III. The company is currently grading for roads around the coal handling facilities as well as for the rail spur. Later a permanent two-mile-long access road will be constructed. Within the mining area itself two haul roads will be constructed to zero percent grade beginning at an elevation near the bottom of the Rosebud-McKay coal seam. This will require a cut in a portion of the present ridge approximately 70 feet deep before the road connects with the mine cut. Within the mine, grades of up to eight percent are contemplated for hauling. Approximately 43 acres are involved in this road system.

The mine will also have an impact on roads outside the immediate vicinity of the site. Traffic will increase dramatically as workers commute to the area and supply trucks make deliveries. Between 40 and 60 automobiles will travel to and from the site daily while many of the supply trucks will be of the heavy duty semi-trailer type. Such traffic breaks down gravel roads, necessitating paving. Better roads in turn would make the area more accessible to visitors and sightseers. This could lead to a minimal commercial development such as a gas station or cafe; possibly at the intersection of County Roads 2 and 28.

The rail spur will be constructed through rangeland from the Yellowstone River valley to the mine. The right-of-way varies in width from 100 feet to 400 feet but probably averages 150 feet wide.

The right-of-way will be fenced with hog tight fencing four and one-half feet high. The Burlington Northern report states that this will have little impact on wildlife.(25) They cite locationg along branch lines where deer regularly cross five foot fences with ease. Antelope might be expected to have more trouble, but the railroad report states that in northeastern Wyoming, with fencing of woven wire, antelope freely migrate across the branch line right-of-way. However, this is controversial as noted in the section on Wildlife.

The right-of-way will be fertilized and reseeded after construction. Since the strip of land will not be subject to cattle grazing, the grass may become quite tall. The railroad report has stated that elsewhere along their system bird life occupies the reseeded right-of-way for nesting and feeding. Herbicides will be used to control weeds (See Physical Environment this Chapter).

Risk of Accidents

Although the high level of mining activity proposed by Westmoreland would indicate a potential for mine associated accidents, safety precautions and regulations will greatly reduce the accident risk. The Mining Enforcement and Safety Administration has the responsibility for setting mine safety standards and supervising the compliance of these standards.

Historical and Archeological Sites Destroyed

Historical sites in the area include evidence of past human activities such as battlefields (Intertribal and Indian-White), military installations, old trails, round-up camp sites, old mines, badmen's hideouts, old homesteads, and other structural remains. There are numerous homesteads long abandoned with old log or adobe structures, sunken root cellars, old equipment, and other items in various stages of deterioration. Some old homesteads places have been completely replaced with modern structures and no traces of the past remain. How many of these and other historical structures will be destroyed by mining is not known at this time.

Indian history here, as mentioned in Chapter II, is vague and not very evident. Except for war-related temporary structures which passing war parties and hunters left behind, there are no significant historical Indian sites expected to be destroyed by strip mining operations.

Unfortunately over the years "arrowhead hunters" have picked and obliterated many surface indications of potentially good and important archeological sites. Indian graves have been vandalized and pictographs destroyed with defacings and superimpositions, while tepee rings and other rock structures have been removed or scattered. One site (24BH1728) was worthy of professional excavation and was uncovered and described. The number of sites which will be uncovered or unknowingly destroyed by mining operations is impossible to estimate at this time.

PHYSICAL ENVIRONMENT

Air Quality

Small pockets of gas, principally methane, may escape from the coal seams but no reference could be found indicating such gases caused problems or pollution in strip mining in the United States or abroad. Apparently when released to the atmosphere, the quantities are so small and dilution so great that the leakage is not detected.

Exhaust emissions will occur from operational vehicles and mining equipment on the site. Due to the magnitude of automobile traffic, vehicle emissions for a small town such as Hardin will probably be greater than that contributed by the mining site vehicle and equipment emissions. Therefore, air pollution from trapped gases or vehicle emissions will be minimal.

Fugitive dust will result in degradation of air quality. Below is a list of sources which will probably be the greatest offenders:

(1) Construction equipment during the road and rail building phase.

(2) Loose spoil banks prior to reshaping and planting.

(3) Mining equpment: dragline, trucks, and loaders, etc.

(4) Blasting.

(5) Crushing and loading. (Although most equipment in both operations will be covered, some leakage is usual in these operations.)

(6) Loading at the rail head and at the terminal in St. Paul, Minnesota.

(7) Loss of coal fines from rail cars during transport unless cover or chemical treatment is provided.

Many of these will be point sources and therefore amenable to control as discussed in Chapter IV. In addition, the sources are low level which should result in rapid dispersion (although conversely, the local effect will be greater). Because the data near the surface would be so variable and localized, it did not seem appropriate to mathematically model the extent of the dust cloud. However, to give an approximation of just how far a dust cloud might travel before it disperses to become significant, empirical relationships were resorted to.(26)

Reports from the mining area at Colstrip indicate that the haul roads are the worst polluters. Moving equipment will pulverize the ground as they haul, creating a layer of fine dust. This source should be inoffensive if the contractor is successful with the road watering programs as planned. If not, a vast quantity of fine silts and clays will be available for the wind to raise into a cloud. To determine the effect of such a failure, an analysis was performed. The computations are presented in Appendix G. The analysis indicates that the dust cloud will travel less than one-half mile before either settling or dispersing to the point at which it becomes less of a nuisance. For the most part, this will fall within the boundary of the Westmoreland property. The fugitive dust at the rail-head and dock should travel an even shorter distance.

After completion of mining and reclamation of the land, conditions should revert to much the same as they are today. This will not preclude further dust storms, however. As pointed out in Chapter II, during periods of high winds and extended dry spells, dust clouds may occur.

In the future, further development of Westmoreland leases is contemplated. However, the effect on air quality is conjectural at this point. One possibility is construction of a gasification plant but until it is known where and when it will be constructed, if at all, further comment seems irrelevant. If further development is planned, additional environmental assessments will be required.

Noise

The quiet of the immediate area will be upset by the roar of the crusher, the blasting, and the rumble of mining equipment. Westmoreland has stated that equipment will operate on a two shift basis: 8:00 a.m. to 12:00 midnight, and that blasting will not take place continuously. One unit train will load out on most days; therefore, the noise will continue from early morning to late at night in varying intensity.

The main effects will be felt by the workers. Sound levels in the vicinity of the crusher and other equipment will probably range from 80 to 100 decibels.(27, 28) When blasting occurs, the level may reach 110 or more decibels. However, since the sound wave decreases in intensity with the square of the distance, one will not have to travel very far from the site before the noise reaches levels below 70 decibels. Using a rule of thumb of a six-decibel increase in sound pressure level with each doubling of the distance from the source,(27) the average intensity one-half mile away would be down to 40 or 50 decibels except during blasting. Of course this will vary with wind direction, barometric pressure, humidity, obstructions such as trees and topographic features.

The effect on livestock and other animals is questionable. Their habitat, once relocated, should be far enough from the mine that the background level of equipment noise will be reasonably low. As for the blasting, the Westmoreland report indicates that it will have little effect.(2) To quote from the report:

> "Cattle have been reported to graze with apparent unconcern within one-quarter mile of the coal pits at Big Sky Mine (just south of Colstrip, Montana) where blasting for coal removal is regularly undertaken. The stress effect on big game is not completely known at this time, but attempts to use exploding noise to scare mule deer in Alberta produced the same result as for cattle. After initial 'startle' effect, the noise was subsequently ignored."

As pointed out in the section on Wildlife this concept is somewhat controversial.

Effect on Land Resources

The mining plan shows there will be approximately 330 acres distributed in the first year of operation and approximately 50 acres annually during the remainder of the project operations. This would be a minimum level of mining since they may secure additional contracts with the passage of time. Westmoreland indicates that an ongoing reclamation program is planned concurrently with their mining activities.

The mining plan provides for the mining of approximately 50 acres annually, 50 acres of spoil banks to be recontoured and 50 acres to be revegetated. It would take a minimum of two years and possibly as long as five years for the revegetated area to become established. Therefore, not counting the plant site acreage, somewhere between 250 and 400 acres would be out of production at a given time after full scale mining is in progress. This would not represent a heavy impact in the area if this level of mining activity were not altered. If the level of mining was greatly accelerated, reclamation would have to increase commensurately to avoid environmental deterioration.

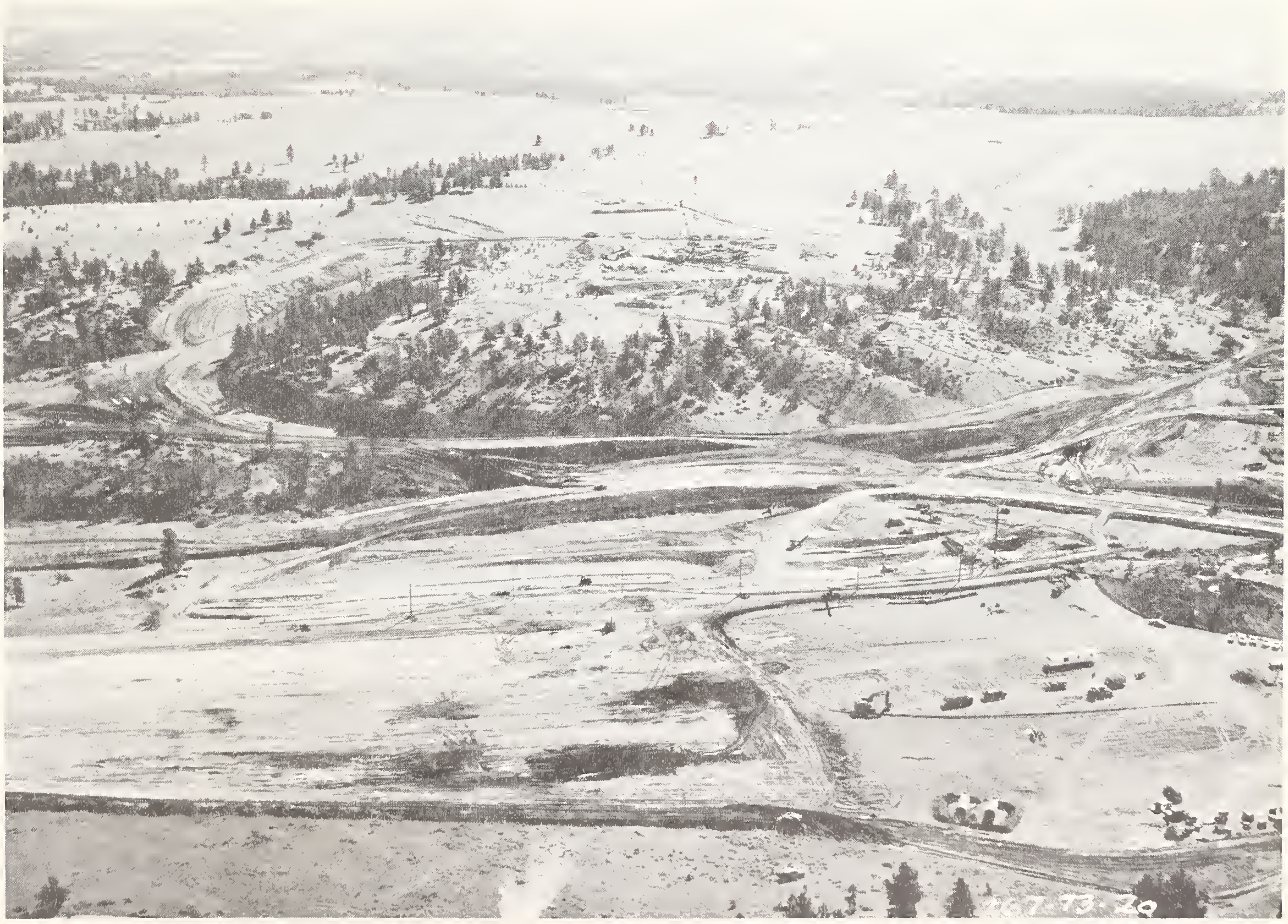


Figure 7. Photograph of the Westmoreland Mine Site

Vegetation and Soils

The impact of coal mining on the vegetation of the area is of two kinds, that on the mined and otherwise disturbed area, and that on the surrounding area.

The coal mining activity will completely destroy all the vegetation on the area from which the overburden material is removed, as well as where the overburden material from the first cut is laid. The construction of haul roads, a railroad loop and coal loading facilities and other structures will destroy additional vegetation.

The mining operation will be followed by land forming to grade and slope specifications after which stockpiled topsoil will be spread. The eventual effect on revegetation will depend on how the overburden material is laid. Especially critical will be the placement of the high-sodium layer found just above the Robinson coal seam and those layers having extremely low permeability. Both of these must be buried under desirable fill material to avoid detrimental effects.

The partnership has this included in their plan and is stockpiling the usable portion of both the topsoil (A horizon) and the subsoil (B horizon) for spreading over the reclaimed and reshaped landscape.

It is inevitable that the nature of the soil will be greatly changed. The original soil profile will be destroyed and a new cycle of profile development and plant succession will take place slowly. Changes will occur affecting permeability, water-holding capacity, density, slope gradient, depth to water, chemical composition, and many other soil characteristics. The impact of these changes will be directly dependent on land reclamation methods and practices.

The effect of mining would have a significant effect on various forms of internal soil life. This would include not only burrowing mammals, insects, nematodes, and earthworms but more importantly micro-organisms such as fungi and bacteria. These micro-organisms are concentrated in the A horizon and if lower horizons are used as topsoil material, serious deficiencies in essential symbiotic and non-symbiotic micro-organisms may result. These may need to be replaced by soil or seed inoculants.

Some innovative land forming and preparation procedures, such as basin development or special mulches, promote soil moisture retention. Under certain conditions this may provide higher soil moisture and ground humidity levels than existed in the original undisturbed soil.

Plant succession on the mined and other disturbed areas will be affected by the kinds of plants remaining on the adjacent areas and on the seeds or propagules they are able to produce. On bare areas various pioneer plants will invade the area. For this part of Montana these invading species include annual bromes and fescues, many other annuals, Kentucky bluegrass, Canada thistle, leafy euphorbia (leafy spurge), Russian centaurea, (Knapweed), rabbitbrushes, poplars, willows, pricklypears, and many others. Typically these plants are not tolerant of shade and have seeds or propagules that are carried by the wind or stick to the fur of animals. Many are weeds.

On north-facing slopes, in places where the mineral soil is exposed and vegetative competition is low, the pioneer plants also include ponderosa pine.

Most pioneer plants are not normally permanent components of the vegetation but gradually give way to various perennials that are not dependent on a good exposure to light. Eventually, through a succession of plant communities, the vegetation may become similar to that which originally inhabited this kind of site. Such a plant community is in excellent balance with its environment and is usually called climax vegetation.

Adjacent to, but outside, the mined area the vegetation will not be destroyed except locally, but a number of detrimental effects can be expected.

Some dust from the mining activities is likely, even with effective sprinkling. The dust will fall on the upper surfaces of plant leaves. It will reduce transpiration through the stomata on the upper leaf surfaces and will reduce photosynthesis by reducing the amount of light.

If the dust is from material high in sodium or other harmful chemicals the effect of the chemicals would probably be noticeable mainly at times when the dust becomes muddy from dew or mist. Rain would wash the material from the leaves, but the soil would then receive some detrimental effect from the harmful chemical. The adverse effects are discussed in greater detail in Chapter V.

Some traffic on areas adjacent to the mine is very likely. The effect on plants includes compaction of the soil, crushing of plants, and injury to the bark of woody plants.

Westmoreland reports that the mining operations presently proposed will remove 54 acres of ponderosa pine forest cover. The railroad right-of-way will remove 25 to 30 acres of timber, and a proposed transmission line may remove five acres more. It is possible that this new activity will slightly accelerate the rate of harvest of timber in surrounding areas. To the extent that this occurs, an unknown additional area will be partially disturbed in the next 10 or more years through harvest of part of the timber and construction of trails for logging. Logging trail construction rather than other facets of timber harvest would be the more significant disturbance. No reasonable estimate can be made, but judgment indicates that this acceleration effect will be minor.

Removal of part of the forest cover through harvest of ponderosa stands of this type will permit minor increases in forage production as well as stimulating growth of residual timber as a result of release from competition. Regeneration in this timber type is normally based upon natural regeneration with the residual stand providing the source of seed.

Timber harvest also improves access as a result of trail construction. These access corridors stimulate better forage utilization by livestock. They also serve as hunter access, a potential stress on wildlife population. However, at this time, hunting is heavily restricted by area landowners.

Westmoreland has sold the timber removed from their actual mining site. See Map No. 8. They will also sell standing timber to be harvested using a selection system from their lands near the mining site. A small lumber mill will locate near the mining site on Westmoreland owned land and process this timber. Slash will be chipped for mulch or burned on site according to state regulations.

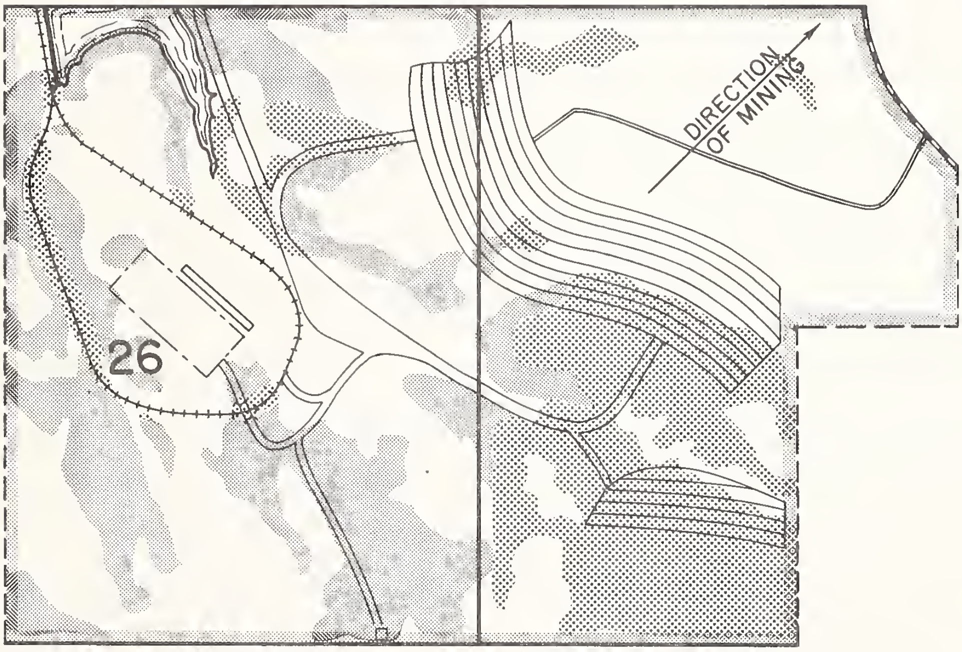
Once a mill is operating in the area, one could expect continued harvest at least on an intermittent basis for a long-term period within the Sarpy Basin, the area being mined. If the timber is milled locally there would be five to ten man years of employment per million board feet log scale harvested.

Wildlife

Although only 380 acres of vegetation will be disturbed during the first two years of mining, the proposed mining area encompasses 1,280 acres.(2) The Tract III boundary, however, includes a total of 14,745 acres and it might be assumed that a large portion of this area will be mined or disturbed at some time in the future. The hugh equip-

MAP 8

TIMBER RESOURCES
WESTMORELAND MINING SITE



LEGEND

▩ Areas where merchantable timber will be cut.

░ Areas of timber not to be cut.

ment complex to complete this mining operation and the associated loss of vegetation, noise, dust, fences, roads, and human intrusion into the area will have immediate and long lasting effects on resident wildlife species.

Loss of Habitat - This strip coal mining operation will require the physical use and alteration of undeveloped lands for mining, storage of topsoil and overburden, construction of roads, a railroad spur, buildings and many other related activities. This area will be largely stripped of vegetation and will, of course be directly lost for wildlife habitat. The loss of only 1,280 acres of wildlife habitat in this area would probably be rather insignificant. There are, however, other factors that greatly expand the probable loss of wildlife habitat.

As discussed in the previous section, Westmoreland will sell the timber from this area and a samll sawmill will locate near the mining site to handle the lumber. In addition to the removal of the trees that provide cover and habitat for many wildlife species, the mill noise, traffic, and human activity associated with this operation will adversely affect resident wildlife species. However, a selective system of harvest will be used and the long-term effects on wildlife will be used and the long-term effects on wildlife may only be minimal.

Vegetation adjacent to dirt roads and trails will be regularly covered with dust caused by vehicular traffic resulting in the loss of this vegetation for wildlife use.

Water released from overburden piles and excavations, sedimentation, ground water, and leached materials reaching surface streams may also have adverse effects upon aquatic plants and animals. The magnitude of this impact will depend upon the quantities and particular polluting substances released. Sufficient information regarding the chemical composition or volumes to be released is not available at this time to quantitatively assess these impacts.

Perhaps the greatest impact on the wildlife species associated with this project will be the intrusion of human activity into this normally quiet and undisturbed area with all the associated roads, traffic noise, and structures required. Roads will be required for access, fences may be necessary for security of equipment, buildings will be constructed for storage and power lines built for electricity. Each of these intrusions will adversely affect resident wildlife species.

Although the impact of each particular disturbance by itself may be relatively small and insignificant, the overall net effect over the length of the mining operation may be the chronic disturbance and resulting displacement of most wildlife species in the vicinity. The duration of permanence of this displacement will depend largely upon the time and success of the reestablishment of native wildlife food and cover. Far more research is needed on the reclamation of mining sites to properly evaluate their capacity to reestablish the growth of indigenous wildlife food and cover plants.

Noise accompanying construction and mining activities will result in a net effect of stress and disturbance to normal wildlife activity and behavior. Most wildlife species will by nature avoid such areas during these periods of activity. The species probably most affected by these disturbances would include mule deer, white-tailed deer, antelope, sage grouse, sharp-tailed grouse, turkeys, pheasants, eagles, and hawks and other migratory birds.

Fires - With the increased use of equipment and human activity in the area, the frequency of man-caused fires may increase. Wild fires result in only a temporary loss of habitat and in many cases are beneficial in the long-run resulting in more abundant browse species and associated forbs. However, with increased activity in the area and improved access, the detection and suppression of fires may result in an overall reduction in acres burned. This factor is not expected to have a significant impact on wildlife or on forest and grasslands.

Railroad spur - A railroad spur line approximately 36 miles long will be constructed to the mining site. While the land and forage removed by the right-of-way is negligible, it will have a significant adverse effect on the deer and antelope in the area. A net wire fence four to five and one-half feet high will be constructed on either side of the right-of-way.(25) While deer can and do readily jump fences this high, the fence and the railroad and its associated activities will undoubtedly impede the free movement of these animals to and from the timber and brush cover and the adjacent cultivated grain and hay fields along Sarpy Creek.

The fence will have a particularly adverse effect on any antelope in the area. Few antelope inhabit this area, however, and the impact on this species may be minimal.

The railroad right-of-way will also cross a portion of a 77-acre slough associated with the H. Miller Ranch. The Burlington Northern has indicated that an attempt was made to circumvent this area but adjacent property would be adversely affected.(25) The location of the right-of-way will occupy only three and one-half acres (4.5 percent) of the water fowl habitat.

Herbicides - The chemical control of noxious plants along the railroad-right-of-way can result in the introduction of poisonous substances in the environment with accompanying adverse effects on wildlife species. The biological effects would depend upon the types of chemicals, methods of application and the volumes used. Noxious weed sprays utilized for this purpose are usually highly selective in their action.

The Burlington Northern uses a standard herbicide program for control of vegetation along their rights-of-way. The 36 mile long Sarpy Creek spur line would require treatment of 41 acres of ground plus an additional five to six acres along side trackage. A four foot width of ground along both sides of the track would be covered in a "Toe Path" pattern. The formulation applied is a tank mixture (field mixed), approved by the Environmental Protection Agency, comprised of the following materials:

(1) Dupont Korvar 1 (Bromacil-Karmex mixture); an 80 percent strength mixture is applied at the rate of 5 lbs. per acre.

(2) Amchem Amizol; a 90 percent strength mixture is applied at the rate of 3 lbs. per acre.

(3) Additives to the above mixture are comprised of either of the following depending upon the herbicide action required:

  (a) 2-4-D Amine applied at the rate of 4 lbs. per acre.

  (b) Banvil (applied at the rate of ½ gallon per acre) and Amdon (applied at the rate of 4/10 gallon per acre).

Impacts on Rare or Endangered Species - The possible presence of only one endangered wildlife species (the peregrine falcon) has been included in the inventory. None have been observed but an occasional bird may visit the area. The proposed mining and associated activities will undoubtedly have an adverse effect on the peregrine if they do inhabit this area. During the duration of the mining activity, they probably would avoid this area.

Fish - As long as water leaving the project area is of a quality in compliance with applicable water quality standards under the provision of the Federal Water Pollution Control Act, there should be no adverse effect on fish life. The proposed use of a settling pond to eliminate sediment, and the apparent absence of any large amounts of toxic materials in the proposed mining area which could be leached out and enter Sarpy Creek, should preclude detrimental effects on downstream fish populations.

Esthetics

The land will be carved into strips of excavation and long, narrow piles of spoil. This will be such an aberration from the present natural setting that for many people the mine will be visually offensive. The addition of the boom of the dragline looming 200 feet above the horizon may further offend some. However, in so isolated a place, few visitors will stumble onto the sight unexpectedly. Most will be coming specifically to visit the mine. Those who may most resent the esthetic disorder will be the ranchers living in the area.

Recreation

Since recreational use of the area is now severely limited, no immediate impact will be felt. In the future, if the demand for recreational sites increases in southeastern Montana, the existence of strip mines in the Ceded Area might tend to restrict recreational use and the impact could become significant. Such an increase in demand however, would be related to a large growth in population which is not presently foreseen, (Chapter II).

Mineral Depletion

Coal and Other Minerals - If the proposed project is developed according to the operational activities now planned, approximately 77,000,000 tons of the 625,000,000 tons of recoverable coal reserves in Tract III will be removed. It is possible that in mining the coal, other potentially valuable minerals may be removed. However, at this time no minerals of commercial value, except the coal, are known to exist in the subject area. In any event, the lease contains a clause which reserves to the lessor the rights to recover any oil, gas, sand, gravel, and building stone discovered to be of commercial value within the lease area. In much of Tract III the mineral rights, other than coal, remain in fee status and are held by various owners.

Water Resources

General - Effects of the proposed Westmoreland Resources Tract III coal strip mining operation on the hydrologic environment will be quite pronounced. Essentially, the mining operation will consist of removing up to 250 feet of overburden and coal, and subsequent replacement and reclamation of the overburden.

Described in the following paragraphs are the probable effects on the water resources and hydrology due to strip mining operations in Tract III.

Acid Mine Drainage - In the eastern part of the United States, acid mine drainage from coal strip mining operations is a major source of water pollution. The occurrence of high metallic sulfide concentrations in the overburden and coal beds, mostly iron pyrite (iron sulfide), in conjunction with acidic soil conditions and high precipitation, have created an untenable situation. Oxidation, hydrolysis, and microbiological decomposition of iron sulfides produce sulfuric acid, while the ferric iron is hydrolized to an extremely insoluble oxide or hydroxide.$^{(29,30)}$ The general equation for the oxide is shown below:

$$\begin{array}{ccccccccc} \text{(Iron)} & & & & & & \text{(Ferric)} & & \text{(Sulfuric)} \\ \text{(Pyrite)} & + & \text{(oxygen)} & + & \text{(water)} & & \text{(Oxide)} & + & \text{(Acid)} \\ 4FeS_2 & + & 15\ O_2 & + & 8H_2O & \rightarrow & 2Fe_2O_3 & + & 8\ H_2\ SO_4 \end{array}$$

The intermediate reduction equations of metallic sulfides may be described by a variety of approximate relationships, but the net result is:$^{(31)}$

(1) To get the metal ion into the form of an insoluble compound stable under surface conditions.

(2) To convert the sulfide to sulfate ion.

(3) To produce relatively acid conditions.

Any free sulfur found in the coal formations will also form sulfuric acid according to the following reactions. When mine water accumulates and is allowed to remain in contact with the exposed vein, the sulfur is slowly oxidized by the oxygen of the air to SO_2 (Sulfur Dioxide), which in the presence of water becomes H_2SO_3 (Sulfurous Acid). Further oxidation forms H_2SO_4 (Sulfuric Acid).$^{(13)}$

$$S + O_2 \rightarrow SO_2$$

$$SO_2 + H_2O \rightarrow H_2SO_3$$

$$H_2SO_3 + (O) \rightarrow H_2SO_4$$

However, acid drainage problems should not occur on the Westmoreland Resources in Tract III, due to the natural conditions which are present:

(1) The sulfur content of the Rosebud-McKay and Robinson coal beds averages only seventy three hundredths of one percent, (0.73 percent).

A general range for classification of sulfur content in coals may be approximated by the following: (32)

Coal Sulfur Class	Sulfur Content (%)
Low	0 - 1
Moderate	1 - 2
High	+ 2

(2) The ground water contained in these coal beds is alkaline, having a pH range (measure of the hydrogen or hydroxyl ion concentration) between 7 and 9 which will probably neutralize acids that form. (13)

(3) The unleached overburden material pH is also highly alkaline.

(4) Westmoreland, in order to mine efficiently, will have to keep the water pumped from the mine. Thus it will have little opportunity to remain in contact with the exposed coal seams.

Reference is made to the following publication which also indicates that an acid drainage problem does not exist in most eastern Montana coal fields. "Coal Development Potential in Eastern Montana," Environmental Quality Council, January 7, 1972. In addition, Dr. S. Groff, Director of the Montana Bureau of Mines and Geology in Butte, Montana, confirmed that the problem is nonexistent (oral communication, April 13, 1973 by Westmoreland Resources).

In the Colstrip, Montana area highly alkaline mine drainage contributions to surface water supplies has occurred. Increased hydroxyl ion and total dissolved solids concentrations in the raw ground water have been noted (oral communication, Mr. Ernest Bond, Montana Bureau of Mines and Geology, June 19,1973). However, this is an area of coal bed aquifer discharge which would tend to magnify the alkalinity increase. Recharge of these coal bed aquifers occurs on Westmoreland Resources Tract III, which would tend to reduce an alkalinity increase. The specific effects of the natural alkaline conditions on mine drainage water in the open mine pit is still an unknown, but the possibility of acid mine drainage is considered to be minimal.

Consumption and Disruption of Water Resources - Infiltration characteristics of the soil over the proposed strip mining area will be altered appreciably. Stripping of the overburden and coal, and replacement with the overburden should increase the porosity of the material. Contouring of the spoils area to retain runoff should increase the availability of water for infiltration. However, the heterogeneous mixture of sandstone and shale (varying in content from 50 to 75 percent shale(33)) in the soil material may act to retard downward seepage of water from infiltration, particularly toward the base of the spoil bank where the overlying material may introduce a compaction effect.

The original hydraulic conductivity (permeability) of the mined-out coal beds will be greatly diminished. These coal beds comprise known aquifers in the Tongue River member over the area of Tract III. The intervening shale and sandstone or siltstone beds are essentially non-water bearing, and may not readily conduct water when utilized as a heterogeneous mixture to replace the coal beds.

Removal of the Rosebud-McKay coal beds will have little effect on the ground water since these strata are dry or only partially saturated in the proposed mining area. The existing northward slope of the potentiometric surface in the saturated coal beds in the eastern part of Tract III indicates isiolation of this area from the outcrop to the west. Therefore, mining of these coal beds is not expected to appreciably affect the hydrogeology in the remainder of Tract III.

Removal of the Robinson coal bed may have a somewhat greater impact. A comparison of the aquifer potentiometric surface map with the structure contour map of the Robinson coal bed surface (2) indicates that this stratum is completely saturated over much of the area available for mining. An artesian head of up to 100 feet over the Robinson coal bed surface occurs to the north and east of section 25, T. 1 N., R. 37 E. Complete reduction of this artesian head at the active open mine cut, by pumping of the drainage water, will create a gradual decline in the aquifer potentiometric surface for some distance surrounding the mining area. The end result will be partial diversion of ground water flow away from springs and Sarpy Creek alluvium to the west, and lessened recharge to alluvium of East Fork Sarpy Creek to the northwest. The extent of the head reduction influence and the amount of drainage flow to the open mine cut is conjectural. Data on aquifer characteristics from aquifer pumping tests and monitoring of static water levels in surrounding observation wells is necessary for accurate determinations. This data is being acquired and may be ready by spring, 1974. It should also be noted that the springs to the west are on property owned by Westmoreland.

Replacement of the Robinson coal bed with a heterogeneous mixture of shale and sandstone in sections 25, 26, and 36 may divert much of the residual ground water flow northeastward away from existing points of discharge along the north and west sides of Tract III.

Regionally (outside of Tract III) the effects of the strip mining operation on ground water conditions in this aquifer will probably be minimal, unless the proposed mining area is expanded considerably.

Consumption of ground water for a potable drinking water supply and for dust control is proposed. The consumption for drinking water will be minimal. Dust control will require an average production over the 20-year project life of about 75,000 gallons of water per day from at least one deep well. During the summer months water production would be maximized, ranging from about 90,000 to 250,000 gallons per day, at the beginning and end of the project respectively. This variation is due to the increase in average haul distance from 0.8 miles to 2.9 miles required by the gradual extension of the open mining pit location over the life of the project. During the winter months little or no watering of the haul roads will be required. The average daily volume of water produced would amount to a discharge of about 50 gpm based on 24-hour-a-day production. Assuming a five-day work week and 20-year project life, as much as 1,200 acre-feet of water may be utilized for control of the dust problem around the mine. Water for dust control will be obtained from a deep well source which taps the Madison limestone aquifer.

Construction of the railroad spur line along the east side of the Sarpy Creek valley will, to some extent, cause disruption of the natural drainage. Diversion of minor drainages to points of concentration will result. Structures at major drainages will present only minimal restrictions to flow. Two irrigation canals will also be affected, slightly increasing hydraulic losses at new structures.

Blasting effects would probably tend to increase the fracture permeability of the coal bed aquifers locally around the perimeter of the mined area.

Detention of surface water runoff on the Westmoreland Resources property will result from construction of the combined railroad embankment - sediment detention dam. Dead storage of approximately 77 acre-feet of water is proposed initially. If continuous impoundment is practiced this volume of water would not be available for downstream use by existing water rights prior appropriators. Quality of water detained by the sediment dam will need to be checked before releasing water to downstream users.

Surface water rights have been filed for by Westmoreland on the following sources of water:

(1) An appropriation of 70 gallons per minute for the sediment detention dam located in the NE¼; of the NE¼, of the NW¼; sec. 26; T. 1 N., R. 37 E.

(2) An appropriation for three gallons per minute from a spring located in the NE¼; of the NE¼; of the SE¼; sec. 26; T. 1 N., R. 37 E.

(3) An appropriation of two gallons per minute from a spring located in the SW¼; of the SE¼; of the NW¼; sec. 26; T. 1 N., R. 37 E.

Ground water rights have been filed for on the following source:

(1) An appropriation for 100 gallons per minute from a well utilizing water from the Madison limestone aquifer and located in the NE¼; of the NE¼; of the SW¼; sec. 26, T. 1 N., R. 37 E.

Degradation of Water Quality

Sediment - Sediment contributions to surface runoff may increase as a result of the strip mining operations on Westmoreland Resources Tract III. Stripping of the vegetation and soil cover will expose the underlying bedrock material which is comprised of shale and sandstone. Excavation within the mine area and subsequent buildup of the spoil bank to or above the natural topography in some areas will increase the opportunity for erosion. The amount of increase in sediment contributions from the mined out areas which might occur is unknown. However, an approximation may be surmised from the USDA Soil Conservation data for the

Wind, Bighorn, and Clarks Fork River basin sediment study. By reclassification of the mine site proper as an eroded area, the base sediment yield from the spoil bank would be at least double or triple that which is presently contributed. Contouring of the spoil bank to promote interior catchment and ponding would mainly expose the outer perimeter to this increased sediment production.

Retention of sediment, contributed by runoff, in a settling pond is proposed by Westmoreland Resources. Increased downstream contributions of colloidal material and sediment fractions lower in specific gravity (coal particles) may result whenever runoff volume exceeds the settling pond dead storage capacity. These sediment fractions would be transported farther downstream along Sarpy Creek before deposition. During periods of high runoff sediment contributions to the Yellowstone River might occur.

Leaching - Assuming that favorable conditions for increased infiltration over the spoil bank occurs, leaching of soluble salts from the shaly spoil material may occur. Should adequate porosity and permeability exist, gradual downward movement of seepage water containing these soluble salts may eventually discharge to surface drainage from the base of above grade spoil banks or continue downward and intercept the regional water table. Although the exact character cannot be predicted, it is possible that the seepage water may be more highly mineralized than the existing ground water. It is anticipated that residual water available for leaching from precipitation upon or irrigation of spoil bank material will undergo a deterioration in quality. This will result in an increase in the hydroxyl ion concentration and soluble salts such as sodium, potassium, calcium, and magnesium and sulfates. Dissolved solids concentrations will increase greatly. Heavy metal concentrations such as iron, manganese, lead, zinc, nickel, and molybdenum may also increase. Increased fluroide concentrations may also occur. Since a paucity of published information on alkaline mine drainage conditions exists, the results of field studies now being conducted in the Colstrip and Decker areas will be useful for future predictions of adverse environmental effects.

Dust Control - Utilization of water from the Madison limestone aquifer will not constitute an environmental hazard, since the dissolved solids content is predominantly calcium sulfate (gypsum). The sodium adsorption ratio (SAR) of water from this aquifer is low, indicative of a minimal sodium hazard.

Wastewater - Sewage treatment facilities are planned to treat liquid wastes from the workers and visitors to the site. The type of treatment is discussed in Chapter IV. The treatment plant will have to be maintained, controlled, and monitored carefully in order to meet Federal and State pollution control standards. Solid wastes will be disposed of in a sanitary landfill or other approved disposal facilities on the Westmoreland property. This facility will also have to be properly maintained in order to meet all Federal and State standards, including but not limited to, the following:

(1) Federal Water Pollution Control Act of 1956 (70 Stat. 498)

(2) Amendments of 1961 to the above Act (75 Stat. 204; PL 87-88)

(3) Water Quality Act of 1965 (75 Stat. 903; PL 89-234)

(4) Amendments of 1972 to the Federal Water Pollution Control Act of 1956 (89 Stat. 816)

(5) 33 U.S.C. 44 - Codes for the Federal Water Pollution Control Act as amended.

(6) State of Montana Senate Bill 94 (The Montana Strip Mining and Reclamation Act).

IMPACT AT THE MARKET AREA

Pigs Eye Coal Terminal

The Pigs Eye Terminal to be constructed on the Mississippi River at St. Paul, Minnesota, will serve as a railroad-waterway transfer and loading facility for shipments of low sulfur coal to midwestern power utilities.

Construction of the terminal would result in direct economic benefits to the Port Authority of St. Paul, Minnesota, construction contractors, equipment manufacturers, railroads and waterway freighting companies and their employees. Incidental economic benefits would consist of taxes paid to governmental agencies and stimulation of economic activity.

In general, construction of the terminal facility will result in the conversion of 221 acres of partially forested floodplain, river-sandbars, etc., into a coal storage and transfer area, disposal site for dredging and excavation materials, and an open floodway. Siting of the terminal over a recently completed landfill will require special design and construction methods to minimize the disturbance to this facility.

An adverse effect on the biota and ground water quality of the disturbed area is predicted by the Corps of Engineers for the terminal facility. Increased barge and rail traffic will result in insignificant adverse effects from noise and air pollution. A minimal increase in Mississippi River flood stage will occur in the project vicinity. In addition, the site will have an adverse esthetic impact and will prevent the area from being used as a park or other recreational facility.

These effects are described in detail in the Environmental Impact Statement for the Pigs Eye Terminal being prepared by the Corps of Engineers.

Mississippi River Barge Traffic

Barge traffic on the Mississippi River would be substantially affected by the import of western coal. The lower energy content of western coal versus Illinois coal (17.0 and 22.0 million BTU/ton, respectively) will result in increased consumption. Coal tonnage presently barged would have to be increased by as much as 30 percent to obtain an equivalent energy supply.

A more significant effect would be the changes necessary in the barge traffic pattern. Much of the coal tonnage presently barged starts and ends downriver along the middle reaches of the Mississippi River. Relocation of barge traffic to the Upper Mississippi River, below Pigs Eye Lake, will result if the terminal is built.

Outbond tonnage past Pigs Eye Lake approximated 4.4 million tons in 1971. The 2.6 million tons of coal presently contracted for through the terminal would result in more than a 50 percent increase in the outbound tonnage. Should the maximum potential tonnage eventually materialize, outbound barge traffic would nearly double.

According to the Port Authority of St. Paul,Minnesota, this increase in barge traffic would not interfere with existing commercial navigation since the terminal facility is located off the main channel. Also, the main channel is large enough to accommodate the traffic. However, impact on recreational use of the river would be significantly adverse, resulting in increased conflict between commercial and pleasure craft. This information is also contained in the Pigs Eye Terminal Environmental Impact Statement.

Coal Burning and Air Quality

The use of Westmoreland coal will have a beneficial impact on air quality in the vicinity ofthe midwestern power generating plants now burning Illinois and Kentucky coal. Depending on the plant and the blend of coal chosen, the emissions of sulfur dioxide will be decreased by 28 to 53 percent. Appendix H presents a summary of the data provided by the power companies.

The amounts of coal burned will be greater since the Westmoreland coal has a lower fuel value than the Illinois and Kentucky coal. However, the fly ash content is reported to be less resulting in a slight overall decrease in residual ash. At any rate, the companies are installing or plan to install electrostatic precipitators for particulate matter reduction at their plants.

The power companies state they do not have definite information on the emissions of trace elements from the midwestern coal, however, an analysis of these elements in the Westmoreland coal is available.(4) This information is presented in Appendix I.

Certain of the plants burn coal from Colstrip, Montana. For these the use of Westmoreland coal will have a minimal impact.

Again, a more detailed presentation is given in the Corps of Engineers' Environmental Impact Statement for the Pigs Eye Terminal.

CHAPTER IV

MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION

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MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION

HUMAN ENVIRONMENT

Economic and Social Measures

The increased personal income which will be realized by Tribal individuals from the coal mining royalties will in itself serve as a beneficial impact, offsetting several features of the project which presently tend to adversely influence personal opinions. An addition of the Indian coal income to the economic base will also serve as a stimulus to individual business enterprise development. Small business and ranching operations will be influenced by increased expenditures of the Indian populace, both on and off the reservation.

The slight to moderate population increase problems imposed on the local culture can be alleviated by encouraging the major influx of people and services to locate in the existing population centers. Hardin, Montana is likely to feel the major effect and the needed mitigating measures for meeting these impacts can be met through existing city governmental entities. It is anticipated that the influx of workers and families into Hardin will cause a population increase of no more than 10 percent, including a multiplier effect.

The Hardin, Montana water system is adequate to serve the increase. Water is obtained from the Big Horn River and treated by clarification and filtration in a plant designed to handle moderate expansions. Solid wastes are disposed of in a sanitary landfill meeting State Health Department standards. However, the sewage collection system and treatment lagoons are not adequate to handle the existing loadings, let alone those from an increased population. The Mueller Engineering firm of Billings, Montana, has recommended in two recent reports that both the collection system and the lagoons be improved.

Since the town's Chamber of Commerce and other organizations are banding together to attract growth, the improvement to the sewerage system will be needed with or without the Westmoreland project. Funding sources are being explored for sewerage system expansion. Additional planning will be done to meet increased urbanization.

Transportation

The railroad plans, as described in Chapter 1, include the essential provisions for protecting the environment. Normal water flow and drainage will be uninterrupted after the construction of bridges over the creeks and placement of culverts in the smaller coulees and watercourses. Highway crossings will meet state and federal highway standards including three with flashing signals, an underpass at Interstate 94 and two county road underpasses. Concrete cattle passes will be installed where the property owners require them and a siphon will carry irrigation water under the tract at one ditch crossing.

The railroad's construction contract with the Morrison-Knudsen Company requires the contractor to keep the impact of construction on the environment to a minimum.(25) This contract encompasses all of the contractor's operations along the railroad right of way, in order to minimize or prevent disruption and damages to the physical and human environment. The provisions of the contract are being enforced by Burlington Northern, Inc.

Risk Of Accidents

The partnership has indicated that safety programs will be stressed at the mine. The Coal Mine Health and Safety Act will be enforced by the Mining Enforcement and Safety Administration to assure accident prevention.

Archeological Site Preservation

Of the eight sites located in the Westmoreland Tract III, Site 24BH1728 (Chapter II) was considered promising enough for salvage excavation. On September 1, 1972, Westmoreland Resources contracted with the University of Montana Foundation to conduct the excavation and work was completed on October 9, 1972. The cultural material obtained is currently being examined at the University Archeological Laboratory. No further salvage plans are indicated at the present time.

The Burlington Northern survey, (1972) conducted along a proposed rail line up Sarpy Creek, stated "No significant archeological antiquities will be destroyed by construction in the examined area". Further plans for salvage archeology were not pursued by Burlington Northern.

Included in the Crow Tribe lease agreement (Section 25) with Westmoreland Resources is a reference to the Antiquities Act of 1906. Under the terms of this Act the destruction of historic or prehistoric ruins, monuments or objects of antiquity without permission of the Government is subject to fine or imprisonment, or both, at the discretion of the court.

The lessee has obtained the required archeological clearances from the Montana State Archeologist, prior to start of construction, as set forth in the lease.

Adverse effects on archeological sites will be minimized by instructing the equipment operators to be watchful and to alert management if they should discover a site. Westmoreland Resources management will have an assessment made by qualified persons if any sites should be uncovered.

If evidence of historic or prehistoric sites are uncovered during mining operations by Westmoreland, they will notify the State Archeologist and comply with the state antiquity laws. Copies of the notice will also be sent to the Area Director of the BIA and Regional Mining Supervisor of USGS.

PHYSICAL ENVIRONMENT

Air Quality

The report prepared by Westmoreland Resources detailing the environmental consequences of their proposed mining operations(2) and subsequent analyses of watering requirements indicates that they realize the problems presented by dust.

Mitigation of the dust problem from topsoil stock piles will be accomplished by seeding at the earliest opportunity to provide stabilization. If dust problems persist, other arrangements will be made by Westmoreland to stabilize the stock piles.

Westmoreland will utilize a program of regular watering to mitigate the effects of dust from haul and access roads. The coal haul roads will require the most water. A water application rate of 4 gallons per 100 square feet of roadway per application is anticipated. The number of water applications planned for the access roads will vary from twice daily during the summer months to none during December through February. Up to eight applications daily on the coal haul roads will be required during the summer months.

Workers will be instructed to wear goggles and respirators, in accordance with Federal Coal Mine Health and Safety Act of 1969, to alleviate adverse effects of dust on workers.

In the case of fugitive dust (particulate matter), the federal secondary standard established by EPA and based on an annual geometric mean of all measurements is 60 $\mu g/m^3$. Whether this is enforceable at the Westmoreland property line or within the mine itself needs clarification. However, the primary standard concerning health (75$\mu g/m^3$) will be enforceable within the mining area.

The revegetation program outlined by Westmoreland Resources for the mining area will eventually diminish residual dust to the point where existing conditions are approximated.

As for the situation at the railhead and the St. Paul wharf, the same regulations hold. The Burlington Northern and the barge company will be required to water, cover, or otherwise enclose the loading and hauling equipment if large amounts of coal dust blow and decrease visibility. At the power plants themselves, the fact that coal with a low sulfur content will be burned rather than the present high sulfur coal will improve air quality in the vicinity of the plants. The Environmental Impact Statement prepared by the Corps of Engineers for the Pigs Eye Terminal facilities in St. Paul is a detailed source reference.

Noise

The partnership has indicated that they will do everything technically feasible to cut down the blasting noise. To quote from their report:(2)

> "Westmoreland will adapt all measures suggested by modern technology to reduce noise and all other adverse consequences of the use of explosives at the mine. The explosives used will also comply with regulations of the Montana Department of State Lands designed to minimize noise, surface damage to adjacent lands and water pollution."

They also must comply with the Federal noise regulations established pursuant to Sections 6(a) and 8(g) of P.L.91-596, the Occupational Safety and Health Act of 1970, and specifically the noise exposure regulations set forth in 29CFR 1910.95.

Reclamation of Disturbed Land

Minimizing Slopes Left After Reclamation - The mining plan provides that the exterior slopes of the original spoil bank be graded to a maximum gradient of 11 degrees except in areas on which the original topography is unusually steep, where the gradient may reach 19 degrees. These slopes would be approximately 20 to 33 percent which can be utilized by cattle for grazing purposes without undue erosion danger. When slopes exceed 33 percent, the quality and quantity of forage produced greatly decreases and the capability of cattle to graze diminishes. The interior spoil banks will not exceed 11 degrees after the recontouring and the final high wall gradient will be reduced to 20 degrees.

These slopes will be highly erosive if left without suitable cover. Westmoreland will insure that the spoil banks are revegetated as soon as possible after recontouring.

Replacing Topsoil - Westmoreland Resources has contracted with Colorado School of Mines to provide soil information from deep soil cores which were drilled on the mine site. (34) Deep soil probes were drilled to a depth of 243 feet or the bottom of the Robinson Coal seam. Chemical and physical properties were evaluated by the Colorado School of Mines. Their report gave a complete analysis of the soils and predictions and recommendations in managing them in a reclamation program. Two soil probes were made in the initial investigations and Westmoreland cored three additional holes, which are currently being analyzed, to obtain more data concerning the reclamation of their proposed mine site.

The Fort Union Formation where the test borings were made is rather uniform. Additional borings are now being made to bear this out.

The natural mixing action of the working dragline will alleviate a portion of the problems that can be expected to be caused by the high sodium, low permeability interburden zones that were discovered in the core tests. In addition, prior to placement of the topsoil on the graded spoil banks, Westmoreland will conduct soil analyses of the upper layers of the banks, checking both permeability and sodium content. (See Appendix J)

Wherever analyses indicate material unsuitable for revegetation, a proper depth of usable subsoil will be added, which with the topsoil, will be of sufficient depth to ensure growth. Depth of this mixture will vary dependent upon the individual characteristics of the graded spoil banks of each point of analysis.

Westmoreland will continue research into alternative solutions to problems posed by the sodium and impermeability. Their continuing research may lead to preferable solutions which will then be adopted upon the approval of those with jurisdiction over the mining and reclamation plans. Recent efforts have produced a topsoil map that is on file at the Billings Area Office, BIA.

Vegetation

After the coal has been removed from a strip, the overburden from the next strip will be placed in the excavation, spread out to the required slope and topped with about six inches of topsoil.

The partnership has considered the following seed mixture for drilling on each acre of prepared land. The vegetation established from this mixture is intended for livestock and upland game forage.

Bluestem (western) wheatgrass	(Agropyron smithi)	5 lbs/ac. clean live seed
Green needlegrass	(Stipa viridula)	5 lbs/ac. clean live seed
Slender wheatgrass	(Agropyron trachycaulum)	5 lbs/ac. clean live seed
Fourwing saltbush	(Atriplex canescens)	5 lbs/ac. clean live seed
Skunkbrush Sumac	(Rhus trilobata)	2 lbs/ac. clean live seed

It will also consider other species including alfalfa and sweetclover and experimental efforts will be made to plant additional woody species for wildlife and esthetic values. These species will include antelope bitterbrush, ponderosa pine, plains poplar (cottonwood), Wood's rose, common chokecherry, willow, and other species.

The Burlington Northern lines will revegetate its right-of-way by use of the Brillion drill where the terrain is suitable and the rest by other mechanical means or manual broadcasting. Fertilizers will be applied prior to the seeding which includes Critana thickspike wheatgrass and Nordan crested wheatgrass.

The addition of various types of mulches has greatly improved the revegetation efforts on spoil banks in test plots at Colstrip. Similar practices will be used on Tract III. Westmoreland will arrange for a lumber mill which will retain the sawdust for use as a soil additive/conditioner and/or a mulch. Disposal of other lumber mill waste products will be accomplished by chipping for mulch or burning in accordance with state regulations.

The Montana Agricultural Experiment Station in revegetation studies at a strip mine site near Decker is testing 50 individual seed mixtures including over 70 grass, forb, and shrub species.(35) This list includes species that are expected to be adapted to each of the several conditions of soil, slope and aspect or direction of exposure. Their object is to "select species for reclamation which are vigorous, heat- and drought-resistant, and alkali- and salt-tolerant. A number of seeding rates are being tested." Should these findings prove useful, Westmoreland will utilize them in their reclamation operation. In addition, several of the soil organism cultures discussed previously are available commercially if needed to help establish various species.

The coal partnership plans to minimize the adverse effects on plants. For those areas outside the mined areas, the practices will include: (1) sprinkling at the mining operation to reduce dust; (2) control measures to prevent erosion and overgrazing; and (3) fencing to keep out traffic and unwanted animals or people.

The acoustic effect of trees in muting noise has been mentioned in Chapter II. To reduce noise, standing timber will be left as long as possible before cutting in preparation for mining.

The partnership has stated that it will comply with all the pertinent reclamation regulations.

Wildlife

Both Westmoreland Resources and B.C. Research have recognized many of the potential adverse effects of the proposed mine operation and related activities on resident wildlife species and have proposed a number of mitigating measures.(2) (4) Although mining areas will be essentially lost for wildlife use throughout the duration of the coal removal operation, the permanence of such loss will be dependent upon the time required and the ultimate success of reestablishing native wildlife food and cover. To date most of the emphasis has been directed toward finding plant species that will grow on mining sites.(36) There is also a need for an inventory of key plant and animal communities and their interrelationships, monitoring techniques to record and evaluate wildlife responses to changes in their habitat, along with additional information regarding food habits and the behavioral and territorial needs of various wildlife species.(36) During their normal management activities, the Department of Fish and Game have collected some information on wildlife populations, and although these data are adequate for establishing hunting quotas, setting seasons and other management functions, they are not specific to this particular area. In order to properly assess the effects of coal strip mining on wildlife species and their habitat, far more detailed and specific information is required. Westmoreland Resources will gather this information and monitor the effects of their mining on wildlife species and their habitat.

In order to maintain wind and water erosion at a minimum, Westmoreland will shape, recontour, and revegetate as close behind the excavation as possible. They have developed a tentative revegetation plan including several key browse species for deer. This plan will be subject to the approval of the Montana Department of State Lands and the U.S. Geological Survey Mining Supervisor.

A large settling pond will be constructed to alleviate most of the introduced sediment, ground water, and toxic materials from the excavation site. Depending on the kinds and amount of toxic materials present, this pond may attract a limited number of waterfowl species and provide a permanent source of water beneficial to cattle and wildlife in the area.

Cattle crossings and underpasses will be constructed along the railroad track which should somewhat improve big game movement and access. The acreage encompassed within this right-of-way will be reseeded and should provide additional food and cover for pheasants, mourning doves and other small non-game birds.

Electrical transmission lines that are built into the area will be constructed in a manner so as to minimize hazard to birds. Wider spacing of conductors and construction of roosts on poles are recommended methods.

The application of any pesticides or herbicides along the railroad right-of-way will be subject to applicable State and Federal regulations and will require approval prior to use.

Westmoreland's proposed mining plan for collecting runoff water in a settling pond will be adequate to protect downstream fish life. The State of Montana's Strip Mine Reclamation Act requires the mining operator to impound, drain, and treat runoff water to reduce soil erosion and damage to grazing and agriculture lands and pollution of surface and subsurface water. Enforcement of the Act combined with a monitoring system to check its effectiveness on discharged water quality parameters will guarantee protection to downstream fish life.

Surface Water

Drainage facilities include an interior drainage system for diversion of runoff to the settling pond behind the combined railroad embankment-sediment detention dam facility.

Interior drainage facilities were designed to minimize accumulation of surface runoff in the mining pit. Diversion of runoff around the mining area and conveyance toward the settling pond were of prime consideration. Accumulations that do occur within the mining pit, from precipitation or subsurface seepage, will be pumped into the interior drainage system.

All interior drainage channels and culvert structures were designed on the basis of a 10-year flood recurrence interval.(37) Although a flood exceeding the design frequency may cause damages within the mining property, mitigation of damages downstream will be realized due to the retention effect of the dam and settling pond.

The sediment detention dam and settling pond will minimize high sediment concentrations in runoff emanating from Westmoreland's property; particularly from the interior drainage system and spoil bank. A settling pond detention storage volume of about 77 acre-feet will be provided below the spillway crest elevation of 3,415 feet. This is presumed equivalent to the 10-year flood frequency runoff volume from the contributing drainage area of 2.4 square miles. A settling pond surface area of about nine acres will result from this storage volume. The surface water quality standards of the Environmental Protection Agency will apply to pond discharge.

Design of the six-foot diameter spillway outlet conduit was based on a presumed 50-year flood frequency. Compacted fill in the upstream dam section of the railroad embankment will be carried to an elevation of 3,435 feet. An impervious blanket covering the upstream dam face will be placed to an elevation of 3,420 feet, which is sufficient to discharge the 100-year flood frequency through the settling pond and spillway with 1.8 feet of freeboard.(38) Although no emergency spillway has been provided, the extreme elevation of the railroad embankment (elevation near 3,480 feet) reduces the necessity.

Reclamation of spoil bank material by contouring, replacement of topsoil and establishment of suitable plant species will eventually reduce sediment contributions from the mined area to a reasonable approximation of existing conditions.

In the remote possibility of acid drainage occurrence, chemical treatment of the mine drainage water will be initiated by Westmoreland Resources as approved by the Montana Department of State Lands or federal regulatory agency.(2)

Surface waters of Sarpy Creek and East Sarpy Creek, as well as several springs are presently being monitored by Westmoreland Resources. The monitoring will be expanded to include surface waters originating on and emanating from the project site upon commencement of mining activity. The Montana Strip Mining and Reclamation Act rules and regulations specifically requires that any coal operator submit this information on a monthly basis.

The proposed sewage treatment facilities include the utilization of chemical toilets during the initial construction phases. Installation of an aerated lagoon followed by an effluent polishing pond, and discharge of the treated effluent to a drain field are presently proposed for the permanent facility. Federal and State standards will be complied with in the design and operation of this facility.(39)

Railroad drainage structures will be designed to pass the 50-year flood frequency. Drainage structures required include seven bridges and 230 culverts.

Ground Water

A hydrologic monitoring system and the operation thereof to study ground water levels and quality changes, will be initiated shortly by the Montana Bureau of Mines and Geology.(40) Characteristics of the aquifer systems utilized or affected by the mining operations will be determined by pumping tests. Monitoring of observation wells over the life of the project will be accomplished to determine long-term water level trends and local and regional effects on the aquifer systems.

ENVIRONMENTAL CONTROLS AND LEGISLATION

General

Protection of the environment is provided for by provisions of certain federal regulations, by the terms of the lease agreement between the Crow Indian Tribe and Westmoreland Resources, and also by certain state regulations. The general environmental protection provisions of these separate regulations are described in the following paragraphs.

Crow Indian Coal Mining Lease

The Crow Indian Coal Mining Lease for Tract III (Contract No. 14-20-0252-3683) contains several provisions for protection of the human and physical environment. As part of the lease agreement the lessee must:

(1) Comply with applicable State mining laws.

(2) Preserve the property and provide for the health and safety of the workmen.

(3) Refrain from dumping of waste materials or tailings on property outside the lease area.

(4) Not harvest, destroy, or damage timber without prior authorization of the Commissioner of Indian Affairs.

(5) Preserve and protect the natural environmental conditions of the land encompassed by the lease or land affected by exploration or mining and take necessary corrective actions within the scope of normal soil conservation and stream and air pollution practices as follows:

   (a) Operations shall not pollute any surface or subsurface fresh water supply.

   (b) Control water supplies in conformity with existing laws and minimize erosion and flood damage.

   (c) Terrace and landscape mining waste disposal areas.

   (d) Minimize air pollution which may result from the operations.

   (e) Submit a plan of implementation in accordance with 25 CFR 177.7 for approval by the Regional Mining Supervisor, U. S. Geological Survey.

In addition, the lessee shall be liable for damages to persons and property resulting from the mining operations. The leased premises and mining operation shall also be subject to inspection by an authorized representative of the Secretary of Interior. The Regional Mining Supervisor, U. S. Geological Survey, is the designated representative of the Secretary of Interior. In this capacity he must review the mining operation and ascertain adherence to the mining plan. After such review, the mining plan may be modified with additional mitigating stipulations. Lastly, cancellation and forfeiture of the lease for violation of the terms and conditions of the lease is provided for.

Federal Legislation

The following Public Laws, U. S. Codes, and Federal Regulations are applicable to the Westmoreland Resources project on the Tract III, Crow Indian Ceded Area coal mining lease.

(1) United States Statues at Large:

  (a) Act of June 8, 1906 (34 Stat. 225) - An Act for the preservation of American Antiquities.

  (b) Act of January 1, 1970 (83 Stat. 1075) - Declaration of National Environmental Policy.

  (c) Act of October 18, 1972 (86 Stat. 816) - Federal Water Pollution Control Act Amendments of 1972.

  (d) Act of 1969 (83 Stat. 742; P. L. 91-173) - Federal Coal Mine Health and Safety Act of 1969.

(2) United States Code:

    (a) 7 U.S.C. 135 - Insecticide, Fungicide and Rodenticide Act.

    (b) 33 U.S.C. 466 - Federal Water Pollution Control Act, as amended.

    (c) 42 U.S.C. 1857 - Clean Air Act, as amended.

(3) Code of Federal Regulations:

    (a) 25 CFR 177 (April 1, 1973 rev.) - Surface Exploration, Mining and Reclamation of Lands.

    (b) Executive Order 11514, dated March 5, 1970 - Protection and Enhancement of Environmental Quality.

    (c) 30 CFR 71,74,77,80,81,82,90 and 100 - Act of 1969 Implementing regulations.

    (d) 30 CFR 211 - Coal Mining Operating Regulations.

The reader is referred to the above statutes for specific details. However, in general they contain the authority for regulation and protection of the social and physical environment, or defer it to the individual states.

State Legislation

On March 16, 1973, the State of Montana enacted a mining and reclamation act in the form of Senate Bill 94 entitled "The Montana Strip Mining And Reclamation Act." The provisions of this Act were formulated to be the most stringent legislation ever enacted for control of strip mining operations. The Act sets forth the policy of the State and its people, requiring the:

(1) Maintenance and improvement of the State's clean and healthful environment.

(2) Protection of its environmental life-support system from degradation.

(3) Prevention of unreasonable degradation of its natural resources.

(4) Restoration, enhancement and preservation of its scenic, historic, archeologic, scientific, cultural, and recreational sites.

(5) Effective reclamation of all lands disturbed by the taking of natural resources.

(6) State Legislature to provide for proper administration and enforcement, create adequate remedies, and set effective requirements and standards (especially as to reclamation of disturbed lands) in order to achieve the aforementioned objectives.

Supervision and enforcement of the Act is accomplished by the Montana Department of State Lands through the issuance of an annual permit to the individual mining operators. Noncompliance of the operator with the requirements of the Act can result in suspension of the permit by the State. In addition, it is required that a comprehensive plan for surface reclamation and restoration be submitted and approved, along with certain other requirements, together with an adequate performance bond.

Violation of the provisions of this Act is subject to payment of a monetary civil penalty. A person who willfully violates these provisions will be found guilty of a misdemeanor and fined accordingly.

The Act is extremely specific and comprehensive in its requirements regarding the protection of the physical environment. Therefore, the reader is referred to the document for details.

CHAPTER V

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

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UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

HUMAN IMPACTS

Some social and cultural change will result from the Westmoreland operations. The extent to which these effects may be considered adverse is dependent first on a particular viewpoint and second upon tribal and other local action taken to alleviate certain conditions.

Social Impacts

The additional income that Crow Tribal members will get from coal development, may in some instances, create situations which some may view as social problems. New ways of life and a trend toward urbanization will create social and cultural changes among members of the Tribe.

There will also be a moderate increase (up to 10 percent) in the population of the surrounding towns. This population increase, accompanied by the urbanization process will result in an increase in social problems in the small towns around the mining site.

The adverse social effects of any endeavor or development can be measured only in terms of the inhibiting characteristics of social change on reaching social goals. With a planning process designed to effectively use tribal income, adverse effects can be quantitatively predicted and their significance evaluated. This planning process is well underway, headed by several Tribal groups including the Mineral Committee. The latter has a representative who acts as a full time liaison officer between the Crow Tribe and the EIS Team.

Economic Impact

The adverse economic effects that could be expected from the proposed action are minimal. Eight-hundred-sixty acres will be fenced and excluded from livestock grazing. This will reduce the annual carrying capacity by approximately 30 animal units during the time of the active operation of the mine. The grazing capacity will be returned to its approximate pre-mining level after full restoration of the mined area is accomplished.

Esthetic Aspects

During mining operations, the spoil banks, dragline, loading equipment, and coal stockpiles will be a visual deformity to the natural setting of the area and may well offend the sensibilities of the onlooker. However, mining disfigurement will last relatively few years compared to the permanence of the restored areas. These will be characterized by the recontoured and reclaimed landscape masking the former overburden piles. While the appearance will not necessarily be displeasing in itself, the aspect will be unnatural among the more primitive surrounding land and may serve as an annoyance. If the haul roads are left intact upon completion of mining, there would be a more permanent disfigurement to the countryside.

Transportation

Automobile traffic will increase in the Ceded Area particularly around Westmoreland Tract III, thus increasing the probability of vehicle accidents. At times, congestion may result along with dust from moving cars, more noise from their engines, etc.

When mining ceases in the area, the railroad will abandon its right-of-way and track will be removed along with bridges and drainage structures. The land will revert to its original use but the cuts and fills of the road bed will remain. Those who see this in later years may be annoyed that it mars the otherwise undisturbed surroundings.

Archeological Sites

During mining operations only limited measures are proposed for the location of archeological sites that may be uncovered. The location and recognition of a viable site will be highly dependent upon the alertness and knowledge of the equipment operators. It is a distinct possibility that an unknown site, unrecognized as such could be overlooked and destroyed.

PHYSICAL IMPACTS

Air Quality

Even without sprinkling, the dust problem and the effect on plants would be similar to a dusty, heavily traveled unpaved road. At such places the mature roadside vegetation does not normally suffer. Two such exceptions to this opinion might be possible: (1) if the dust contained a sodium salt or some other harmful constituent, these contaminants could burn the foliage but only under conditions of dew or mist that could dissolve these harmful materials; the slightest rain would wash the dust off the leaves but the harmful effect would then be transferred to the soil; (2) in the case of germinating seedlings or possibly slightly larger plants even uncontaminated dust might cause some injury.

Most wildlife will probably move away from the mine site. It is likely they and livestock would be far enough removed to breathe dust only occasionally. The workers, however, will breathe much larger amounts. The portion of the dust in the one or two micron size will be respirable and may irritate the lungs and eyes making both areas more susceptible to infection. Safety of the workers will be another concern. If low visibility occurs it would increase the likelihood of accidents.

Noise

A large increase in noise level is unavoidable. As discussed in Chapter III, the major effect will be felt by the workers at the mine.

Land Use Impacts

After mining, the original surface of the landscape will be altered. Only through an unreasonable expense and amount of effort could the land be put back into its original contours and condition. In many instances, the overall land surface gradient will be less than the present slope. In some instances, this condition may favor production of more vegetation than the original capability of at least a portion of the existing landscape.

The high sodium zone will present a serious problem to Westmoreland reclamation plans as this deeper zone would normally be placed on the top of the spoil pile. Unless the planned measures are taken to insure that toxic-sodium rich material is placed well below the surface, adverse effects are probable. Vegetation would be slow and difficult under these adverse soils conditions.

Another problem to be considered are the low permeabilities found in many zones of the overburden. If, in reclamation and revegetation, the impervious material is placed near the surface, ponding and alkaline seeps could be expected to occur within a short time period.

The Wibaux soil series, which is usually lacking in topsoil, occurs in association with other soils in the area which generally provide more material for topsoiling purposes. In areas of extensive Wibaux soils, lack of topsoil will present problems in reclamation which will be corrected by stock piling and redistribution.

The Midway soil series which is found in abundance in the mining area is also shallow, averaging only 10 inches in depth above unweathered shale. These soils will present serious problems of reclamation similar to those of the Wibaux series.

In surface mining, the overburden becomes unconsolidated and somewhat more bulky. In the reshaping and restoration process, a degree of compaction occurs. However after reclamation, some settling will occur and will therefore limit use of the newly reclaimed land. The construction and maintenance of paved roads would be difficult on the unstable land. Building construction would be similarly hampered on these lands. Given adequate time for reconsolidation, elevations will be slightly lower, with contours similar to the original undisturbed land. The land will eventually stabilize and be no more limited in its use than undisturbed land.

Vegetation

All vegetative cover, including forest, in the mined area and support facilities areas will be removed during the mining operation. The degree of adverse impact will depend upon the rapidity of revegetation including restoration of partial tree cover on the area.

Certain plant species are extremely slow in reinvading a site where they have been destroyed by tillage or other disturbances. There will therefore be a change in composition of plant cover on the disturbed area.

The whole mining project may slightly accelerate timber harvest in the general area. This, however, need not be an adverse effect, providing timber harvest is carried out using partial cutting systems that retain the younger, more vigorous elements of the existing timber stands. Ponderosa pine is well suited to partial harvest systems.

Wildlife

There are a number of adverse effects on wildlife associated with this project that are unavoidable. Human intrusion, noises, access roads, and associated physical structures will result in some harassment, disruption, and the eventual displacement of many of the wildlife species present. Blasting, construction, and other noises directly associated with the mining activity are likewise inevitable.

The destruction of vegetative cover will involve nearly 400 acres during the first two years of operations and the immediate mining area encompasses 1,280 acres. These immediate areas, of course, will be lost for forage production and habitat for wildlife until they can be revegetated.

During the actual mining operation, the excavated site and "highwall" will create a potential hazard to wildlife species, particularly big game animals, that may wander into the area.

A net wire fence, four to five and one-half feet high will be built on each side of the 36-mile railroad right-of-way. This fence will impede, although not prevent, the free movement of deer, antelope, and other game to and from timbered and brushy cover to the cultivated fields along Sarpy Creek. There will be increased road deaths of wildlife due to the road traffic. Similarly, improved access into the area may result in increased hunting pressure.

Surface Water

Quantity - Approximately 77 acre-feet of water will be retained by the sediment detention dam. Only sporadic flow from the dam will be allowed. Effluent will conform to Water Quality Standards of the State of Montana. Seepage and evaporation losses from the settling pond will preclude year-round water storage by this facility. Runoff from flooding and wasting of mine drainage water will comprise the major contributions to the pond. Westmoreland proposes leaving the sediment detention dam in place as a stock watering pond and potential irrigation water source, subject to approval by State and Federal regulatory agencies.

Quality - Sediment contributions to Sarpy Creek in excess of those presently experienced may occur from extreme flooding conditions which greatly exceed the capacity of the mine interior drainage system. The conditions under which this might occur are:

(1) The central positioning of a high intensity summer thunderstorm over the mine area.

(2) The presence of a relatively large unreclaimed or denuded spoil bank area susceptible to erosion by runoff.

(3) Accidental release of water from the sediment detention dam. This occurrence is not anticipated since releases from the dam will be closely regulated.

Acid mine drainage is not anticipated. It is however expected that alkaline mine drainage conditions will occur due to the character of water contained in the coal bed aquifers.

Suspended coal fractions that might be included in downstream sediment contributions would be relatively inert chemically. The dilution factor afforded by high flood volumes in the streams during intense storms would tend to lessen the effects from these sources of pollution.

Ground Water

Quantity - Spring flow now emanating from the Rosebud-McKay and Robinson coal aquifers and nearby wells may be adversely affected by the mining operations. The result will be either cessation or diminution of flow to some of the wells and springs, particularly on Westmoreland's land along the west and north sides of Tract III. This will occur at some point in time after commencement of mining operations.

Removal of the coal bed aquifers, pumping of mine drainage water, and replacement of aquifers with unclassified overburden may alter the ground water flow patterns sufficiently to create this situation; particularly in the Robinson coal bed aquifer.

Production of ground water from one of the deeper artesian aquifers may comprise a ground water "mining" operation. The effect of unrestricted artesian flow or concentrated pumping from a well may result in localized depletion of ground water in storage in the aquifer. Probable extent and magnitude of this depletion would be dependent upon the aquifer utilized and the applicable hydraulic characteristics. The deep aquifer that has been tapped is not a source of water for springs or shallow wells in the area of the mine site.

Regionally (outside of Tract III), the effect of the mining operation on availability of ground water from the shallower aquifer systems is not anticipated to be substantial. Little if any adverse effect outside of Tract III is anticipated due to ground water production from deeper aquifers.

Quality - The quality of the shallow ground water could be adversely affected by leaching, mixing of water from different aquifers, etc., but this is not anticipated due to the extensive thickness and low permeability of the overburden fill. However, the quality of the shallow ground water will be monitored periodically throughout the life of the project so that remedial action may be taken if deterioration does occur. No occurrence of ground water quality deterioration in the deeper aquifers is anticipated from aquifer mixing, etc. , since adequate well construction standards will be followed.

CHAPTER VI

ALTERNATIVES TO THE PROPOSED ACTION

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A mining plan having been submitted, the Department may either approve the plan as submitted (the proposed action); require modification of the plan; or reject the plan. It is probable that, if the Department fails to act on the plan within a reasonable period of time, a court of competent jurisdiction would compel action. Because of this, rejection of the mining plan is considered as the "no action" alternative; such a decision would result in no mining taking place on the lands in question.

In considering any alternatives it must be borne in mind that the primary purpose of leasing this particular coal is to provide income and employment opportunities to the Crow Tribe.

A - APPROVAL OF THE MINING PLAN

The approval of the mining plan will carry with it such stipulations and requirements as to ensure that the plan will be followed as set out. The mitigating measures as set out in the mining plan will be subjected to possible modification as the monitoring and supervisory functions are carried out in the proposal already discussed.

B - REQUIRE MODIFICATION OF MINING PLAN

A second alternative action is to require mining plan modifications to include changes in configuration of the mined area, production rates, or reclamation requirements:

(1) Configuration of Mined Area: The configuration of the mine proposal optimizes the environmental effects, resource conservation, transportation access, and surface ownerships. Changes in this configuration while possible will tend to reduce optimum levels and increase environmental impacts, or economics associated with the proposal. Such modifications to the proposal will require examination and environmental assessment to establish specific environmental effects.

(2) Production Rates: The present plan calls for mining approximately 4,000,000 tons of coal annually to supply existing contracts.

Decreasing the mining rate would force Westmoreland to be in violation of the sales contract terms. Since the coal would still be required by the contracting utilities, they would be forced to rely on other sources of coal (high sulfur eastern coal or western coal from other sites). A lower mining rate would also reduce the employment and royalty income to the Crow Indians. There would be a reduction in annual environmental impact because less land surface would be disturbed.

Increasing the rate would have the benefits of higher royalties to the Indians, payroll, and taxes if the coal sales are increased. An increased rate of land disturbance and its associated impacts would also result. However, if additional sales contracts are not obtained, the increased rate of mining would require the storage of vast quantities of coal on the ground. This in turn would lead to additional costs of coal delivery, coal deterioration, and environmental problems from dust and fire.

(3) Alternative Reclamation Plans: In considering the reclamation plan for restoring the mining site, Westmoreland followed guidelines specified in the lease as well as those found in applicable federal and state regulations. Since the present regulations that Westmoreland has used as guidelines for the reclamation plan calls for an extremely high level of reclamation it is doubtful that going beyond the present plans would benefit the environment significantly.

Less stringent reclamation plans would lead to greater environmental impacts on the land and people such as less vegetative cover, shallow ground water disruption, esthetic damage, wind and water erosion, and hazardous conditions. The costs of coal production would, however, be less and lower utility costs could possibly be passed on to the consumer.

C - REJECTION OF THE MINING PLAN

The alternative of rejecting the mining plan could be followed by (1) submission of a new mining plan by the company, or (2) lead to a determination (by the Department) that mining could not, for environmental reasons, be allowed anywhere on this lease.

(1) Rejection with New Plan - Rejection, followed by a submission of an acceptable new mining plan, would still involve mining on the leased lands. There would be a transfer of impacts to elsewhere on the lease, in greater or lesser magnitude. Coal would still be made available to the power plants and income would accrue to the Crow Tribe. If the mining plan were to be altered to the extent that the site preparation and facility contruction were rendered obsolete, additional impact

would result as the new site is prepared. Impacts on soil, water, and air would be repeated at the new site and reclamation made necessary for present site.

(a) Alternate Site - The site of the proposed Westmoreland mining development could be relocated to another site in the lease area. In deciding upon the location of the initial new site on Tract III, Westmoreland gave careful study to economic, engineering and environmental considerations of the mine and transportation facilities.

The present site gives access to the most economically recoverable coal. The transportation facilities (railroad loop and spur) being constructed to serve the site is the route that minimizes the impact from cuts and fills and can best serve other coal reserves on and adjacent to the leased area. The location of the rail spur line is the one that covers the least amount of recoverable coal, thereby permitting recovery of the largest portion of coal with the least amount of economic and environmental impacts.

The site selected has economic and environmental advantage over other sites because of the favorable overburden to coal ratio and the economic advantage of the transportation system serving the site. Relocation of the service facilities and spur line at this time would create serious economic problems for Westmoreland and would result in a transfer of environmental impacts to another site.

(b) Alternative Mining Methods - In considering the assumption that the coal underlying the Westmoreland leases is to be extracted, the alternative of underground mining methods must be explored. This mining technique would cause less immediate damage to the surface environment than strip mining. However, the primary motivation for underground mining is that it is the most economical way to extract coal when the producing strata is located at great depths. This condition does not exist on the Westmoreland property. The relatively shallow overburden of 50 to 100 feet over the Rosebud-McKay coal bed and 150 to 200 feet over the Robinson coal seam, precludes underground mining as an economic alternative.

The percentage of coal recovery by underground mining methods would probably not exceed 60 percent, versus almost 90 percent for strip mining since top coal and pillar would be left in place to support the back. Also, mining equipment presently available has been designed for coal seams less than 10 feet in thickness, requiring a new family of equipment for the 20 to 30 foot seams present on Tract III.

Hazardous mining conditions underground are another consideration. Dangers such as roof falls, coal falls, fires, water, explosions, and gas dust inhalation are all too common in spite of stringent Federal mining regulations and careful supervision. The fatal accident rate for underground mining is much greater than that for strip mining.

Manpower productivity for strip mining operations is also higher, on the order of 16 times, than that attainable by underground mining personnel.

Subsidence at the surface due to underground mining might also result. The self-supporting competency of the shale and sandstone overburden when the coal beds are mined from below is unknown. The occurrence of subsidence in North Dakota and Wyoming would be an indication of the probability.

Contour strip mining along the bottom coal bed outcrop contour line, followed by auger mining, would result in a substantial reduction of land surface removal. However, reclamation problems with the exposed highwall are encountered after the mining of a single stripping cut through the maximum possible thickness of overburden. This is due to the unstable condition of the highwall, created by subsequent auger mining. The probability of uncontrolled caving and accidents is high. Subsidence of surface can be expected after mining. Steep slopes and unstable highwalls are probable.

Since auger mining cannot extend further than 400 to 600 feet into the highwall, all of the coal beyond would be left untouched unless another excavation were begun. Also, only about a 30 percent recovery of coal would be realized from that portion mined by augering methods, and thus this mining alternative would seem extremely wasteful.

Economic techniques for extraction of insoluble solids such as coal by in-place mining have not been developed. In-situ burning of coal and capture of the volatile gases relased is being conducted on an experimental basis. Should this process ever become feasible, the energy recovery levels and amount of surface subsidence that may occur would still be highly unpredictable.

(c) Coal Use Alternatives - The low sulfur content and relatively low heating properties of the coal underlying the leases indicates that the most economically feasible energy producing uses to which the coal may be put are steam generation of electricity, coal gasification, and coal liquefaction. Rather than shipping the coal great distances, such plants could be built adjacent to the mine. However, environmental considerations would indicate that shipment of the coal to energy consuming locations would have fewer adverse impacts on the Crow Ceded Area, the reservation, and southeastern Montana in general. The effect of burning the coal in the midwest power plants would be to reduce the sulfur dioxide emission levels.

(i) Mine Mouth Power Generation - This type of facility requires proximity of a large supply of water (up to 17 acre-feet per megawatt of capacity annually), an adequate site location, and means of distribution to a consumer market. Construction of electrical power generating facilities in the immediate vicinity of coal mining developments is advantageous from the standpoint of energy transport. However, extra-high-voltage (EHV) powerline transmission grids would have to transport energy to marketing areas.

The process of converting coal to electrical energy by steam generating plants is relatively standardized. Finely pulverized coal is mixed with air, while being fed into a furnace and ignited. Energy from the combustion process, in the form of heat, is transferred to water in a boiler which is then converted into high pressure steam. The steam is sent to a turbine where extracted energy from the steam is used to drive an electrical generator. The electrical transmission system then distributes the generated power to marketing areas.

The main by-products of this process are waste heat from conversion of exhausted low pressure steam to water, and fly ash, sulfur dioxide gas and other chemical and heavy metal contaminants. Evaporative cooling towers or dry cooling facilities may be utilized to dissipate the waste heat. Complex precipitators or flue gas scrubbers are required to remove the particulate and gaseous combustion by-products. The most advanced equipment presently available for this purpose is capable of removing as much as 99 percent of the particulate matter. However, due to the vast quantities of coal utilized, even this small particulate residual, amounts to an enormous atmospheric pollution load. Removal levels of gaseous by-products such as sulfur dioxide at the high percentages attained for particulates is not possible with present technology. With existing technology it is possible to remove a minimum of 50 percent or more of the sulfur dioxide. Removal levels of other contaminants such as flourine and heavy metals is considerably higher than for the gaseous by-products. 1/ Adequate disposal facilities for these contaminants must be provided to guard against other forms of pollution.

(ii) Coal Gasification - It is feasible to convert coal to various gaseous forms as a substitute for natural gas. The synthetic gas produced would have to approximate the quality of natural gas, which contains a minimum heating value of about 950 BTU's per cubic foot.

1/ "Federal Air Pollution R. and D. on Sulfur Dioxide Pollution Abatement," Publication of hearing before a Subcommittee of the Committee on Government Operations, September 5, 1968, 90th Congress, 2nd Session. Also, Interim Report for the same committee, March 13, 1969.

Basic approaches for conversion of the coal to synthetic gas are as follows:

(1) The indirect approach, whereby a synthesis gas (400 to 500 BTU's per cubic foot) is formed by partial combustion of coal, or by the reaction of coal with steam; after which the gas is cleaned and catalytically methanated.

(2) The direct approach which involves the reaction of hydrogen with coal to form methane gas.

Presently there are about 65 different coal gasification processes known, none of which are able to produce gas at a price competitive with recent natural gas prices in the United States. Of these, the German Lurgi process would be most feasible, since fewer conversion steps are necessary. This process is more efficient in utilization of the energy contained in coal. Steam generators are capable of transforming only 30 to 40 percent of the heat energy in coal into electricity. A conversion factor of about 60 to 70 percent of the heat energy is possible in the Lurgi coal to synthetic gas process.

Pollutant by-products from coal gasification plants such as hydrogen sulfide, carbon dioxide and spent ash, etc., can be controlled more readily than those produced by coal fired steam generating plants because in the gasification process, most of the coal is not burned but is gasified by heat and chemical reaction.

Annual water consumption requirements for coal gasification processes range from 40 to 120 acre-feet per million cubic feet of daily gas production. The Lurgi process would require lesser amounts of water than most of the other processes.

Recent technological advances in this field have been made through the use of fluidized bed gasifiers for production of power gas which has a low heating value of 200-300 BTU's per cubic foot. This gas is then utilized to drive a combined gas turbine - steam turbine power cycle capable of attaining an electrical generating efficiency of around 50 percent or higher, as compared to the 30 to 40 percent efficiency for coal fired steam generating plants.

(iii) Coal Liquefaction - A synthetic crude oil by-product can also be manufactured from coal by the Lurgi and other gasification processes by the addition of hydrogen, which combines with the carbon in the coal to form hydrocarbons. Refinement of this synthetic crude oil into various petroleum products such as fuels and petrochemicals (used for the manufacture of consumer and industrial products) can easily be accomplished with existing technology. Since natural crude oils are presently less expensive, commercial coal liquefaction plants have not been constructed in the United States.

(iv) Environmental Factors - The use of the coal in power generation, coal gasification, and liquefaction would have a massive impact on the area, far exceeding that of the Westmoreland proposal. All would have greater economic impact but their environmental costs may more than overshadow their benefits. Other generating plants lying outside the Ceded Area will likely add further to the environmental costs. While no environmental statement is offered for detailed analysis, it might be worth mentioning three of the greatest impacts such plants would have. First, any of the three would tend to change a rural area into one that is at least moderately industrial. Second, each process requires vast quantities of water for cooling and other purposes. While most of the use would not be consumptive, the quality of the water would be degraded either thermally with the cooling process or chemically by the huge scrubbers required for power generating plants. Third, but far from least, air quality would diminish. Assuming proper control were maintained at the plant, it would not likely decrease below existing federal and state standards. However, pollution control technology has not reached the state where the present level of air quality could be preserved. The recent Supreme Court ruling regarding non-degradation of existing air quality levels by industrial or other development may preclude the utilization of these processes in "clean" areas such as eastern Montana. In addition, if more than one plant were constructed, and if the wind were to combine their exhaust plumes, the cumulative effect would result in below standard air quality and environmental damage even if the plants met the pollution control standards individually. It is also noted that authorities do not agree as to what the proper standard should be for some trace elements such as flourine. At any rate, the equipment that would be required for cleaning up the plant emissions could be considered fair sized chemical plants in themselves.

Other processes, although not feasible from an economic and technical standpoint at this time, are included to indicate that they were considered as other possible alternative uses of coal.

(v) Magnetohydrodynamics (MHD) - The basic concept for MHD was established in the early 1800's by Michael Faraday. Patents on the process were issued in the early 1900's. Significant progress in refining the process was made during the late 1950's and early 1960's. Additional research is needed before a full scale plant can be constructed.

The MHD electrical power generation process basically comprises the passing of a hot ionized gas or liquid metal vapor (conducting fluid) through a magnetic field. MHD is more efficient than the conventional steam generation process because it combines into one step all of the existing steps required (from heat to mechanical force to electrical power) to convert coal or petroleum fuels into electrical energy. MHD is generally thought of as a topping cycle for steam generation or gas turbine cycles, the waste heat energy from MHD being used to power these cycles. Overall efficiency from this type of plant would be in the range of 50 to 60 percent. Several variations of the process are available:

(1) Open Cycle Gas MHD - This is the most developed cycle, in which the working fluid or plasma is a seeded gaseous combustion product. Powdered coal or other fossil fuel is mixed with preheated and/or oxygen enriched compressed air and burned at temperatures of $4,000^{\circ}$ to $5,000^{\circ}$ F. The hot gases are then seeded with cesium or potassium (to increase electrical conductivity of the gas) and accelerated through a nozzle at supersonic speed. A superconducting magnet surrounding the nozzle causes the hot gases (plasma) to become the "armature" of a direct current generator. Electrical current generated is

then extracted by electrodes, converted to alternating current, and fed into a power transmission grid.

(2) Closed Cycle Gas MHD - This is a similar concept which is designed to operate at lower temperatures (3,000° to 3,500° F). The process utilizes as a working fluid seeded noble gases, such as helium, in a closed system which are externally heated by fossil fuel combusion or a high temperature nuclear reactor.

(3) Closed Cycle Liquid Metal MHD - This variation of the MHD process will operate at even lower temperatures (1,500° to 3,000° F). Heat energy supplied by fossil or nuclear fuels is utilized to vaporize the liquid metal before it is accelerated through the magnetic field. Efficiencies are slightly reduced with this cycle.

The heat transfer and mechanical efficiency factors which limit conventional powerplant efficiencies are minimized or eliminated. Thus overall efficiencies as high as 60 percent (a 1/3 to 1/2 increase over steam generation plants) can be attained with the open cycle system.

Technological problems associated with the life of metal plant materials are encountered with open cycle MHD due to corrosion, erosion and ash or other deposits. Although these probmlems are less acute with the closed cycle MHD systems, they have other technological problems.

The higher efficiencies attained with this process generates less waste heat, reducing (by a factor of 1/3 or 1/2) the amount of cooling water necessary for heat dissipation. Thermal pollution of water supplies is drastically reduced, or in some cases eliminated altogether.

Since process economics requires that a 99 percent or higher recovery of seed material be achieved, the use of high efficiency electrostatic precipitators and other pollution control devices is necessary. Close operational control of these devices will assure low atmospheric pollutant emission levels.

(vi) Fuel Cells - This process is an electrochemical device in which the chemical energy of gaseous or liquid fuels is converted into low-voltage direct current electricity. The process can attain an efficiency of 50 to 60 percent. Almost one and one-half times the amount of electricity can be generated from a ton of coal in a fuel cell as in a conventional power system. However, the economic infeasibility of this method plus the lack of proven performance on a large scale prevents its being considered as a viable alternative.

(d) Transportation Alternatives

(i) Alternate Rail Spur Routes - The Burlington Northern considered alternate locations for their rail spur. (25)

Alternate routes connecting the Westmoreland site with existing Burlington Northern lines at Hardin and at Colstrip were considered. Analyses of these routes indicated that their construction would result in considerably more disruption to the environment than the rail spur route along Sarpy Creek that was finally selected. Because of the rougher terrain between Colstrip and the mine site and between Hardin and the site, deep cuts and high fills would be required. These cuts and fills would destroy more agricultural, grazing, and forest lands than will the selected route.

Alternate routes along Sarpy Creek were also studied. Each of the alternate routes would affect adjacent property owners adversely to a greater degree than the route that has been selected. Environmental effects were also deemed to be more adverse along the alternate routes studied. The route that was finally selected was chosen because it has the lowest monetary and environmental costs, and was the route least objectionable to the property owners.

Several alternatives to the construction of a railroad spur line for conveyance of coal from the mine site to existing transportation facilities were also considered by Burlington-Northern.

(ii) Coal Conveyor System - Construction of a conveyor system along the existing Burlington-Northern spur line rights-of-way would be considered a viable alternative route to railroad transport. Land requirements for a conveyor system would approximate those necessary for the spur line. However, access across the rights-of-way would be inhibited by the above grade conveyor equipment. The continously operating mechanical equipment would have to be completely isolated by fencing or other suitable means to eliminate a hazard to the human environment. Nearby residents would definitely be cognizant of the noise and dust problems associated with this type equipment. Electrical power would provide the necessary motive force. A separate transportation system for movement of mining equipment and supplies would still be required.

(iii) Coal Slurry Pipeline - Coal slurry pipelines have been used to transport crushed coal over long distances for several previous coal mining developments. The most noteworthy being the 275 mile long Peabody Coal Company Black Mesa pipeline in Arizona. Physically, a pipeline constructed underground would be environmentally pleasing since it is invisible, except for pumping facilities. This type of facility has proven to be an efficient coal transporting mechanism. Electrical energy requirements for transport of the slurry are minimal. However, the system does require substantial quantities of water (on the order of 200 acre-feet per million tons of coal) for formation of an easily transportable coal slurry. Treatment and disposal of the water which is separated from the coal slurry at the downstream end of a pipeline are associated problems. Unless marketing facilities such as a power plant or other suitable use is available, recovery of the transport water is not feasible and it must be discharged to waste after treatment. Provisions for transportation of mining equipment and supplies would still be necessary.

(iv) Truck Transportation - Truck transportation of coal from the mine site to a railhead on the Burlington-Northern main line would result in a much greater environmental impact than either of the previous alternatives. The land surface area required for a paved heavy duty highway would be several times greater than required for a railroad spur line. The immense tonnage of coal to be moved would require a fleet of more than 500 twenty-ton trucks. Truck traffic along the roadway would be extremely heavy, constituting a hazard to any pedestrian or automobile traffic. Motive power requirements created by such a fleet of trucks would far exceed (approixmately nine fold) that necessary for a coal train comprised of 100 or more coal tender cars. This would be reflected by increased fuel consumption creating an unnecessary drain on petroleum fuel reserves. Exhaust emissions to the atmosphere would also be increased several fold. This alternative mode of mine to railhead coal transport would seem to be the least desirable.

(2) Rejection With No Mining Allowed

Rejection followed by determination that, for environmental reasons, no mining will be allowed on the leased lands, would: deprive the Crow Tribe of royalty income from the leased lands; deprive the power plants of a source of low sulfur coal; and require substitute energy sources.

(a) Alternate Sources of Tribal Income - Under the present royalty agreement and sales contract, the Crow Indians will receive approximately $700,000 annually for 10 years. Renegotiation of the royalty agreement for the final 10 year period will probably result in higher annual payments. This amount of additional revenue will nearly double the present level of tribal income at a time when the Crow Indians are in need of funds for development of the reservation resources. Employment will further increase Indian income. Maximum development of Tract III coal could result in as much as $100,000,000 of income to the Crow Indians over the next 20 or more years.

If coal mining is not permitted at the proposed site, income to the Crow Tribe could be provided through the further development of the agricultural resources or the expansion of the land base. The initial investment costs of this alternative would be extremely high (in the neighborhood of $15,000,000) to provide an increase of tribal income of the same magnitude as the coal royalties on the annual mining rate of 4,000,000 tons. These investment funds would need to be provided to the Tribe through grants or very long term low-cost loans.

Although industrial development on the reservation is not planned on a large scale, industry could also provide increased tribal revenue. Investment costs for this alternative would also be extremely high and the environmental impacts of many types of industry would be more severe than for coal extraction.

The Federal Government could exchange federal coal at another location for that at the proposed mining site. The exchange would serve to transfer the environmental impacts to another location.

The Federal Government could also purchase the coal rights from the Crow Indians if the mining plan is rejected. While there are no accurate estimates of the total amount of funding requirements needed for a buy-out, the estimate of $100,000,000 royalty income to the Indians from Tract III coal development is indicative of the magnitude of the value of the coal resource. This alternative may require new legislation if it is to be considered.

Income to the Tribe and to the tribal members could also be provided through federal grants and welfare assistance. These income sources have been providing an increasingly greater proportion of the income to the Crows over the past several years. A further increase in their income sources can be expected unless large scale development of Crow Indian resources takes place.

In considering the alternative of not approving the mining plan, the fact that Westmoreland Resources and Burlington-Northern have already constructed a large portion of the mine service facilities and the spur line cannot be overlooked. The land has been disturbed at these sites, and changing location of coal mining at this time would tend to double such impact.

(b) Alternative Supplies of Coal - Expansion of existing centers of mining activity in eastern Montana is considered as a viable alternative. The confinement of strip mining activity to those areas already developed, which are conducive to favorable mining conditions, could have a lessor environmental impact since virgin territory would not be involved. There is also merit in comprehensive large scale development planning for a limited number of mining areas. Among the advantages are: (1) better utilization of existing service, transportation, and community facilities; (2) confinement of possible pollution problems to fewer areas, etc. However, in view of projected electrical energy consumption and enforcement of air pollution standards in heavily industrialized areas of the midwest the demand for low sulfur western coal may outstrip the production and expansion capabilities of existing mining areas.

Some increase in adverse effects could be expected by expanding mining in existing mining areas. Increased population and increased acreages of disturbed land together with the associated impacts of these increases will result. In addition, income would be foregone to the Crow Indians if mining would be expanded in other areas as an alternative to mining in the Ceded Area.

The abundance of low sulfur coal in eastern Montana prevents the Westmoreland location from being unique in its ability to supply the needed coal reserves. Indeed, a great many locations might be leased which could perform in this capacity. The environmental impacts of such an alternative would be similar to those covered by this report although the degree of each impact might be greater or less depending on the site. A new site would merely transfer the possible physical environmental problems to another area. In addition economic benefits to the Crow Tribe may not be realized, allowing existing social environmental problems to continue.

(c) Non-Coal Energy Alternatives - If development of the lease is not allowed, alternative sources of energy could be obtained from:

(1) Oil
(2) Natural Gas
(3) Nuclear Energy
(4) Oil Shale
(5) Tar Sands
(6) Geothermal Energy
(7) Hydroelectric Power

These energy alternatives are discussed in detail in the following Environmental Statements:

(1) Final E.I.S. for the Prototype Oil Shale Leasing Program, Vol. II, 1973. Available from the U.S. Printing Office.

(2) Draft Environmental Statement of Development for Santa Ynez Unit, Santa Barbara Channel, California. Vol. III (pages VIII 81-265) DES 73-45.

(3) Draft Environmental Statement for Deepwater Ports. DES 73-37.

The most likely replacement for coal would be oil, natural gas, or nuclear power. The 4,000,000 tons of coal to be produced annually under the proposed action will equal 6.76 X 10^{13} BTU's. Quantities of other energy sources required to supply an equal energy value are: 11,600,000 barrels of oil; 65,500,000,000 cubic feet of natural gas; and 228,000 pounds of U_3O_8.

The environmental impacts of these coal replacements used in these magnitudes are also discussed in the above mentioned references.

(d) Other Alternatives

(i) Continued Usage of High Sulfur Content Coal - Continuing utilization of high sulfur content eastern and midwestern coal at existing power generating plants could be accomplished by removal of the sulfur content from the raw coal; injection of low cost chemical additives into flue gas streams to convert sulfur dioxide into physically trappable compounds; and installation of chemical processing equipment to enable the removal of sulfur dioxide from flue gases.

The technology for removal of sulfur from coal is presently unavailable. However, research on mechanical removal of the iron pyrite mineral content in coal pulverization processes at power generation plants is being developed. Removal rates in excess of 70 percent of the pyrite is possible. However, in many coals the organic sulfur, which comprises from 50 to 70 percent of the sulfur content, is not removable by mechanical methods.

The recovery of sulfur oxides after combustion through the use of chemical additives is technologically feasible. The use of a low cost additive chemical which will react with the sulfur oxides by converting the gas to a solid, in conjunction with fly-ash removal devices, is extremely attractive due to the relative simplicity and low capital cost. The most promising additives are pulverized limestone and dolomite. Under proper operating conditions the use of these additives can effect a removal of up to 40 percent of the sulfur dioxide content of flue gases. The removal rate is highly dependent upon the particular reactive character of these occurring carbonates. A modification of this process is the use of a wet scrubber to collect the solid material produced. With this type of system, removal of as much as 95 percent of the sulfur dioxide may be effected. The by-product of this process is calcium or magnesium sulfate which has little or no commercial value.

The sulfur removal would result in transportation cost savings because the eastern and midwestern coals are located from 500 to 800 miles closer to the point of consumption than the coal from the proposed mining site. The higher BTU content of eastern coals would result in further transportation savings.

Several sulfur dioxide removal chemical processing methods requiring sophisticated equipment are the catalytic-gas-phase process and the alkalized-alumina process. These processes may be utilized in the dry phase or wet scrubbing equipment may be added to convert the processes into a wet phase. The sulfur dioxide content of stack gas emissions may be reduced from 90 to 95 percent by these processes. Recovery of saleable sulfur compounds are an added benefit.

The capital cost of the various approaches to sulfur dioxide removal may range from $3 to $5 million or more per installation. Operating costs are not well defined at present. In addition, the necessary space requirements and the antiquity of many existing coal fired steam generating plants may comprise additional deterrents to the installation of sulfur dioxide removal equipment.

(ii) Reducing Energy Demand - Still another alternative for meeting the national energy dilemma is to halt the rapid rise in demand for energy by changing consumer desires and buying habits through increased costs for certain types of goods and services.

Energy conservation can be achieved by reducing the consumer demand for products requiring large amounts of energy in their manufacture. This could be accomplished in part by increasing the existing preferential rate structure of high energy use industrial consumers. The purchase price of their products could then rise drastically in comparison to similar or other products being produced more efficiently. This would permit consumers to make rational choices between manufactured goods having different energy requirements. In place of or in addition to preferential rate structure, other controls could be imposed, such as rationing and limitations on consumption oriented advertising.

The direct use of energy by consumers could also be reduced by restricting the amount of automobile use and by conserving electricity and heating fuels in the operation of homes. This could be accomplished through appeals for voluntary reductions or through an increase in the direct cost to the consumer.

Impacts of this alternative would be to reduce the use of renewable natural resources. Depending on the type of energy uses curtailed, there could be inconvenience to people. The regional extent, types, and intensity of the impacts would depend on the degree and types of energy demand curtailed.

(iii) Modify EPA Requirements - The modification of the Environmental Protection Agency's restrictions on SO_2 emissions of the utility plants could permit the continued use of eastern and midwestern coals and thereby reduce the demand for low sulfur western coals. Such modifications would slow the economic growth of Great Plains Region. High SO_2 emissions would remain and contribute to the air pollution problem in the midwest manufacturing area.

CHAPTER VII

RELATIONSHIP OF SHORT-TERM USE TO MAINTENANCE OF LONG-TERM ENVIRONMENTAL PRODUCTIVITY

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RELATIONSHIP OF SHORT-TERM USE TO MAINTENANCE OF LONG-TERM ENVIRONMENTAL PRODUCTIVITY

HUMAN ENVIRONMENT

Socio-Economic Effects

The income to the local people, especially the Crow Indians, will give them an opportunity to increase their material standard of living and self-determination. The trained labor force should be capable of being more productive through the mine employment opportunities. These skills learned through the PINTO training program and through work experience could be expected to carry over into other areas of employment as mining employment decreases at the end of the mining agreement.

The local people, again primarily the Crow Indians, can expect to go though some changes in their way of life or their culture. Whether this change is desirable or undesirable depends on local action and personal point of view as pointed out in Chapters IV and V.

Transportation

The improved rail transportation may have two long-term effects. The spur line could serve other uses including further development of the area's coal resources. Plans for such development are too nebulous to discuss in detail at this time and must be covered in subsequent impact statements. A second effect will be to facilitate transportation of this remote source of coal to help relieve the current energy dilemma in the country. As yet no one has made headway in slowing down the rising curve of energy use.(41) Until technology develops other means of producing power economically (which authorities estimate may take as many as 20 years to achieve) improved transportation to carry the coal to the generating plant is one part of the concerted effort being made to produce more electricity.

PHYSICAL ENVIRONMENT

Air Quality

Any air pollution from dust caused by the strip mine will cease when the mining ends provided the company is successful in establishing a ground cover over the reclaimed area. If not, dust will continue to be blown. But as the grasses thicken and spread, dust conditions should return to the same level they were before mining began.

Land Resource Use

There will be at least five or six years loss of grazing or other agricultural use from the time when overburden removal begins until the restored land has been revegetated. This period allows about three years for overburden removal, mining, replacement of earth material, land forming, fertilization, and other treatment and land preparation. It will take another two years to reestablish new vegetation. If the new land use is to be for growing small grains or other crops, the idle period will be shortened about two years.

The shifting nature of the mining operation will be accompanied by such inconveniences as the need to keep moving the fence line between the mine and the new pasture if the revegetated spoil area is to be grazed.

The probable primary land use will be for grazing and wildlife habitat after reclamation. Plans have been made to reseed to grass and shrubs all the mined areas. There may be more recreational opportunities after the mining, which could become more beneficial than the grazing if the land is developed and opened to public use.

The effect of dust, fumes, etc., on plants growing near the mining operation could continue for about four or five years at any one point. The effect west of the operation will diminish and the effect east of the operation will increase as the mining progresses northeastward.

Approximately 54 acres of timber is to be eliminated by mining. Lesser and scattered areas of forest will be eliminated by railroad and powerline construction. In this process, most of the timber so removed is to be utilized by a local lumber mill. The loss is both short and long term; though eventually the area could again be stocked with timber similar to some of the stands now present.

Considering the area surrounding the actual mining site, there may be some stimulus for greater timber utilization on a short-term basis. On a long-term basis, this increased utilization will probably take place with or without coal production as wood product marketing factors dictate increasing use of marginal sources of this raw material. The first logical step in managing these lands for timber as well as forage production is to harvest over-mature and mature timber. Timber harvest could provide a minor added element of diversification and therefore, a slight stabilizing effect on the local economy, which is now dependent on livestock and crops.

Wildlife

Westmoreland Resources have indicated the project will last at least 20 years and the short-term uses are defined as extending at least through this time period. During the period of the actual mining operation, all but perhaps the small rodents, ground burrowing animals and small birds peripheral to the area will probably be displaced. The long-term affects of this project will largely be dependent upon the extent, time required, and ultimate success of reestablishing native vegetation for wildlife food and cover. If the proper distribution and volumes of native grasses, forbs, trees, and key browse species can be reestablished following the mining operation the long-term effects may be completely overcome. If this goal can be achieved, all forms of native wildlife species will again move into the area from surrounding habitat following mining activities. However, if the proper distribution and volume of vegetation is not achieved, with revegetative efforts limited to expediency, the wildlife carrying capacity will be reduced and the species pattern may change.

Water Resources

In the Ceded Area, development of the surface and ground water resources has been limited mainly to furnishing low consumption domestic and agricultural water supplies. The low population density and agricultural economy of the area has not warranted extensive water supply development. Larger communities nearby generally obtain their water supplies from sources containing better water quality.

Proposed depletion or consumption of shallow ground water within Westmoreland Resources Tract III for mining purposes should have only a minor effect on long-term regional use. This is particularly evident when it is considered that beneficial use of this water is restricted by the limited well production capability and poor water quality available from the coal bed aquifers. Depletion and curtailment of use from these shallow ground water sources may be remedied through utilization of other sources available at greater depth.

Coal Resource Use

Quite obviously, once the coal is utilized its availability as a resource will be destroyed. How this will affect long term productivity is a matter for conjecture. Other sources of energy are being developed through intensive research programs (see Chapter VI) and it is distinctly possible that within 30 years coal will be superseded as the primary source for thermal energy in the production of electrical energy. However, other uses may come to the fore such as the conversion of coal to natural gas, or reconstituting its form completely to provide such consumer goods as plastics or even food products. Technology is advancing in so many directions that the future needs for coal cannot be accurately foretold.

CHAPTER VIII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

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IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Archeological and Historical Site Damage

Unless heavy equipment operators are instructed to watch for artifacts and other evidences of human activity, some valuable archeological sites heretofore buried may be completely and permanently destroyed. Special training of equipment operators and additional inspection may be required.

Historical items, like pioneer relics and movable objects could be removed and saved. However, antique hunters have removed practically all vestiges of historical homesteads and settlements in the area.

Coal Resources Exploited

If the subject mining operation is carried out according to existing and probable future plans, approximately 77,000,000 tons of coal will be mined and consumed. These resources cannot be replaced and will not be available for future alternative uses.

Topography

The surface of the ground will never return to its exact original shape. The recontoured ground will have a slightly more regular appearance. Even years after revegetation a visitor will know that man reshaped the land, due to the lack of random hollows and the slightly lower elevation differential even though the contours will approximate those of the original terrain.

Vegetation

A change in the plant composition after reclamation is almost inevitable. It would not be practicable to try to restore all the species. After many years when the climax community is finally established, it will no doubt be different although, according to the reclamation law, it will equal in quantity and quality the plant community that now exists.

Water Consumed

The proposed average production of 75,000 gallons of ground water per day from a deep aquifer source will be committed to use as a dust control measure during periods of mining operation for the project life. Depletion of ground water in the coal bed aquifers and discharge to waste as mine drainage will constitute commitment of this water supply. Water use for construction purposes, during the initial project phases, will also be necessary.

Water Quality Damage

Alkaline drainage conditions in the mine area are anticipated. A remote possibility exists for the occurrence of acid mine drainage and colloidal sediment contributions to surface water supplies, although no permanent damage to this resource is anticipated. However, monitoring of impounded runoff and drainage water quality, and measurement of sediment contributions to the settling pond will be necessary to determine if remedial measures are required.

Quality of shallow ground water supplies should not be adversely affected, although some seepage of leachate through the spoil bank material to the potentiometric surfaces of the coal bed aquifers may occur.

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS FOR PREPARATION OF DRAFT

Other Federal Agencies

Consultation with other federal agencies provided the BIA task force with data and general information which assisted in the timely preparation of this environmental impact statement. Several federal agencies also reviewed the working draft of the statement.

The U.S. Geological Survey offices in Billings, Montana, provided coal reserve information as well as hydrologic data. They also were extremely helpful in providing review comments on draft material.

The Bureau of Sport Fisheries and Wildlife personnel provided substantive amounts of data for the wildlife inventory and the expected impacts on wildlife from coal development.

The Soil Conservation Service offices in Billings and Hardin, Montana, provided soils and sedimentation data.

The Bureau of Mines in Denver, Colorado, supplied mineral inventory data.

Hydrologic data and informal review and consultation on the statement was received from the Bureau of Reclamation, Billings, Montana.

The Environmental Protection Agency, Denver, Colorado, and the Bureau of Land Management, Billings, Montana, provided informal review and consultation during the early stages of the statement preparation.

Coordination between the Corps of Engineers at St. Paul, Minnesota, and the BIA task force was carried out since the Corps' statement concerning the Pig's Eye Terminal and the Crow Ceded Area statement are companion reports.

State Agencies

The Montana Department of State Lands provided extremely helpful review of early draft material and also served as the contact agency for other state offices.

The Bureau of Mines and Geology Offices at Billings and Butte, Montana, supplied hydrologic and mineral data.

The Department of Natural Resources Office at Helena, and the Oil and Gas Commission Office at Billings supplied resource and mineral data.

The Air Quality Bureau supplied air quality information and standards.

Montana Fish and Game Offices at Helena and Billings, were contacted regarding game counts and hunting use.

Mr. Joe Rawlins, a consulting geologist from Billings, Montana, was consulted on the subject of mineral reserves in the area under study.

Mr. R. J. Brown, a consulting chemist, also from Billings, provided information regarding the soil chemistry, the coal analyses, and the chemistry of acid mine drainage.

Burlington Northern Railroad officials, John Davies and Don Peinovich of Billings, consulted with task force members on matters of railroad spur construction and location.

Crow Indian leaders were consulted before and during the preparation of the statement.

Public Hearing

Comments from the public were received at a hearing held at a location near the proposed coal mining site. These comments together with written comments were answered and are included as addenda to this statement.

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REFERENCES

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APPENDIX

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Appendix A-1 Soil Survey and Evaluation Criteria

Capability Class Irrig.	Dry	Mapping Unit	Series and Type	Topsoiling Quality
	VI w	3B	Haverson-Lohmiller soils freg. flooded	Good
	IV e-3	13D	Lohmiller silty clay loam	Fair: silty clay loam
II c-1	II c-2	14A	Korchea loam	Good
III e-1	III e-3	19B	Kyle silty clay	Poor: silty clay
I	III c-1	21A	McCrae loam	Good
II e-1	III c-1	21B	McCrae loam	Good
II s-1	IV e-3	22B	Glenberg fine sandy loam	Good
II e-1	III e-3	23B	Thurlow silty clay	Fair: silty clay loam
III e-1	III e-3	23C	Thurlow silty clay	Fair: silty clay loam
III e-1	III e-3	24B	Fort Collins loam	Fair: clay loam
II s-1	III s-1	25A	Heldt silty clay loam	Fair: silty clay loam
III e-1	III e-3	25C	Heldt silty clay loam	Fair: silty clay loam
	IV e-3	34C	Midway silty clay loam	Poor: less than 8"
	III e-3	37C	Cushman loam	Fair: clay loam
III e-1	III e-2	45C	Nunn silty clay loam	Fair: silty clay loam
II e-1	III e-3	46B	Wages loam	Fair: less than 16"
III e-1	III e-3	46C	Wages loam	Fair: less than 16"

Appendix A-1 Soil Survey and Evaluation Criteria (cont.)

Capability Class		Mapping Unit	Series and Type	Topsoiling Quality
Irrig.	Dry			
	VII s	129E	Terrace escarpments	Too variable to rate
	IV e-3	136D	Thedalund-Midway complex	Fair: less than 16"
	IV e-3	147C	Chugter complex	Good
	VI s	309A	Hysham loam	Poor: contains soluble salts & sodium
	IV e-3	313D	Lohmiller-Midway silty clay loams	Fair: silty clay loam
	VI e-1	334D	Midway-Thedalund complex	Poor: less than 8"
	IV e-3	336D	Thedalund-McCrae complex	Fair: less than 16"
	IV e-3	345C	Nunn-Midway silty clay loams	Fair: silty clay loam
	VI w	413A	Haverson-Lohmiller frequently overflows	Good
	IV e-3	438C	Nelson fine sandy loam	Fair: less than 16"
	IV e-3	462D	Spearman-Wibaux complex	Fair: less than 16"
	IV e-3	529D	Harvey loam	Good
	III e-2	636C	Thedalund loam	Fair: less than 16"
	IV	636D	Thedalund loam	Fair: less than 16"
	IV	638D	Nelson-Glenberg fine sandy loam	Fair: less than 16"

Appendix A-1 Soil Survey and Evaluation Criteria (cont.)

Capability Class Irrig.	Dry	Mapping Unit	Series and Type	Topsoiling Quality
	VI e	736D	Thedalund-Wibaux complex	Fair: less than 16"
	VI e	736E	Thedalund-Wibaux stony loams	Fair: less than 16"
	VII e	736F	Thedalund-Wibaux complex	Fair: less than 16"
	IV e-3	123D	Thurlow-Midway silty clay loam	Fair: silty clay loam
	III e-3	347C	Spearman loam	Fair: less than 16"
	VI e	536E	Thedalund-Rock outcrop complex	Fair: less than 16"
	IV e-3	738D	Nelson-Alice fine sandy loam	Fair: less than 16"
	III e-3	35C	Renohill silty clay loam	Fair: silty clay loam
III e-1	III e-3	69C	Richfield silt loam	Good
	VI e-1	434D	Midway-Lismas shale outcrop complex	Poor: less than 8"
	VII e-1	536F	Thedalund-Rock outcrop complex	Fair: less than 16"
	IV e-3	836D	Thedalund-Nelson complex	Fair: less than 16"
III e-1	III e-3	421C	McCrae loam	Good
	IV e-3	38C	Terry fine sandy loam	Fair: less than 16"
III s-1	III e-2	177C	Hydro loam	Poor: less than 8"

Appendix A-1 Soil Survey and Evaluation Criteria (cont.)

Capability Class Irrig.	Capability Class Dry	Mapping Unit	Series and Type	Topsoiling Quality
	VII s	208B	Bone Clay	Poor: high salinity
I -1	III c-1	69A	Richfield silt loam	Good
	IV e-3	124C	Fort Collins loam channeled	Fair: clay loam
	IV e-3	129D	Kim loam	Fair: 8 to 15%
	III e-3	347C	Spearman loam	Fair: less than 16"
	VII	134F	Midway-Shale outcrop complex	Poor: less than 8"
	III c-1	177B	Hydro loam	Poor: less than 8"
IV s-1	VI s	326B	Allentine-Bone complex	Poor: clay texture
	IV s-2	509B	Hydro-Allentine complex	Poor: less than 8"
	VI e	634E	Doney silty clay loam	Fair: less than 16"
	VI e	734E	Wayden-Regent silty clay loam	Poor: less than 8"
	VI w	316A	Haverson-Lohmiller soils	Good
II c-1	II c-2	114A	Korchea silty loam	Good
	III e-2	164C	Ascalon sandy loam	Fair: sandy clay loam
	VI e	229E	Clapper-Midway complex	Fair: more than 5% coarse fragments
	IV e-2	248D	Doney-Reeder complex	Fair: less than 16"
	IV e-2	445C	Savage-Wayden silty clay loam	Fair: silty clay loam

Appendix A-1 Soil Survey and Evaluation Criteria (cont.)

Capability Class Irrig.	Dry	Mapping Unit	Series and Type	Topsoiling Quality
	VII e	2134F	Wayden-Shale outcrop complex	Poor: less than 8"
	VI e	3229E	Britton	Poor: more than 5% coarse fragments
I -1	III c-1	12A	Haverson loam	Good
	III e-2	48C	Reeder loam	Good
II s-1	II s-2	74A	Belfield silt loam	Fair: silty clay loam
II e-1	II e-2	74B	Belfield silt loam	Fair: silty clay loam
III e-1	III e-2	74C	Belfield silt loam	Fair: silty clay loam
III e-1	III e-3	125C	Cherry silty clay loam	Fair: silty clay loam
		202E	Savage and Frazer soils	Fair: silty clay loam
II e-1	II e-2	545B	Savage silty clay loam	Fair: silty clay loam
	IV e-2	445C	Savage-Wayden silty clay loam	Fair: silty clay loam
		68D	Dust sandy loam	Fair: less than 16"
	III e-2	164C	Ascalon sandy loam	Fair: sandy clay loam

A complete description of all mapping units and capability classes is available at the U.S. Soil Conservation Service Office, Hardin, Montana.

Appendix A-1 Soil Survey and Evaluation Criteria (cont.)

Notes to Appendix A-1 - Permeability measurements expressed in inches per hour.

Very Slowly permeable	< .2
Slowly permeable	. 2 - .63
Moderately permeable	.63 - 2.0
Rapidly permeable	2.0 - 6.0
Very Rapidly permeable	6.0 +

Soil Depth in inches

Deep	> 36"
Moderately Deep	20" - 36"
Shallow	10" - 20"
Very Shallow	5" - 10"

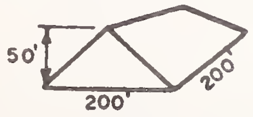
Appendix A-2

Topsoil Availability
Reclamation by Soil Mapping Units

Areas Affected	24C		36C		136D		345C		438C		736D		736E		836D		Total	
	Ac	%	Ac	%	Ac	%	Ac	%	Ac	%	Ac	%	Ac	%	Ac	%	Ac	%
Roads--outside loop	0	0	0	0	10	20	0	0	0	0	5	10	35	70	0	0	50	100
Maintenance Area--in loop	0	0	0	0	12	100	0	0	0	0	0	0	0	0	0	0	12	100
Loading facility--60% inside loop	0	0	0	0	5	100	0	0	0	0	0	0	0	0	0	0	5	100
Loop--total inside = 88 ac.	0	0	0	0	43	59	0	0	0	0	12	16	18	25	0	0	73	100
Mining	2	2	12	13	8	8	0	0	20	21	10	11	26	27	17	18	95	100
Covered by overburden (box cut spoil)	0	0	13	16	0	0	0	0	2	2	1	1	66	81	0	0	82	100
TOTAL TO BE STOCKED ***	2	1	25	8	78	25	0	0	22	7	28	9	145	45	17	5	317	100
Covered by impoundment	0	0	0	0	1	9	2	18	0	0	0	0	8	73	0	0	11	100
Covered by stocked topsoil**	0	0	0	0	7	45	0	0	0	0	0	0	8	55	0	0	15	100
Distribution in Sec.25	18	5	1	0	64	17	0	0	78	21	58	15	67	18	94	24	380	100
Distribution in Sec.26	0	0	72	11	134	21	25	4	0	0	241	37	178	27	0	0	650	100
TOTAL AREA DISTRIBUTION	18	2	73	7	198	19	25	2	78	8	299	29	245	24	94	9	1030	100

* Reference ASCS Soil survey--Bighorn County

** 317 acres of topsoil to be moved at 1.0' average thickness = $\frac{317 \times 43{,}560 \times 1}{27}$ = 511,426 cu.yd.



$\frac{200 \times 200 \times 50}{27 \times 2}$ = 37,000 cu.yd.-- stocking capacity/acre 511,426 cu yd ÷ 37,000 cu.yd./acre = 13.8 + 1.2 for ends = 15 acres

*** 1972 through 1975

Appendix B PLANTS FOUND IN THE CEDED AREA

Explanation of the notations following the standard plant name. (Usefulness code)

A	Species not listed in BC inventory of Tract 3 but found by Planning Support Group on 16 and 17 May 1973
¢	Species found elsewhere in the ceded area by the Planning Support Group on 16 and 17 May 1973,
D	Species that is a source of commercial drugs
O	Species with attractive flowers or other ornamental value
P	Species that may be poisonous to humans or livestock under certain conditions
U	Undesirable species -- weed
W	Species useful for wildlife

If any of these letters is enclosed in parentheses, it means that the listed genus includes species having the indicated characteristic.

Ponderosa pine (Pinus ponderosa scopulorum) is the only tree of sufficient size and abundance to be useful as a timber tree in the ceded area.

The Latin name used in the 1942 edition of Standardized Plant Names is the one used. Latin names in parentheses are synonyms in common use.

The standard plant name is the one used in the 1942 edition of Standardized Plant Names. Names in parentheses following the standard plant name are other common names, which in some cases are more common than the standard plant name.

For considerable information on the adaptability of a number of species, particularly those useful and usable for revegetation purposes, consult the recent publication entitled "The Interagency Forage, Conservation and Wildlife Handbook".

PLANTS FOUND IN CEDED AREA

PLANT SYMBOL	LATIN (scientific) NAME	STANDARD PLANT NAME (Other common names in parentheses)	USEFULNESS CODE
Cryptogams			
		misc. unidentified fungi, algae, lichens	W
		misc. unidentified mosses, liverworts	W
		unidentified fern species	¢
	Selaginella densa /not in SPN/	selaginella (small clubmoss)	¢
Grasslike Plants			
Care	Carex spp.	sedge species	W
Cael	Carex eleocharis	needleleaf sedge	¢
Cafe	Carex filifolia	threadleaf sedge (niggerwool)	A ¢ W
Eleo	Eleocharis spp.	spikesedge species	W
Tyla	Typha latifolia	common cattail	O W
Grasses			
Agsm	Agropyron smithi	bluestem (western) wheatgrass	W
Agsp	Agropyron spicatum	bearded bluebunch wehatgrass	W
Ange	Andropogon gerardi (A. furcatus)	big bluestem	W
Ansc	Andropogon scoparius	little bluestem	W
Arlo	Aristida longiseta	red threeawn	W U
Bocu	Bouteloua curtipendula	sideoats grama	
Bogr	Bouteloua gracilis	blue grama	W
Brom	Bromus spp.	brome species	W
Brte	Bromus tectorum	cheatgrass brome	W

Grasses (continued)

	Bromus spp.	other annual bromes			W
Camo	Calamagrostis montanensis	plains reedgrass			
Calo	Calamovilfa longifolia	prairie sandreed			
Elci	Elymus cinereus (E. condensatus, var. pubens)	(inland) giant wildrye (basin wildrye)			
Feid	Festuca idahoensis	Idaho fescue			
Hoju	Hordeum jubatum	foxtail barley		U	W
Kocr	Koeleria cristata	prairie junegrass			W
Muas	Muhlenbergia asperifolia	alkali muhly (scratchgrass)			W
Poa	Poa spp.	bluegrass species			
Popr	Poa pratensis	Kentucky bluegrass			W
Spcr	Sporobolus cryptandrus	sand dropseed			W
Stco	Stipa comata	needleandthread		U	W
Stvi	Stipa viridula	green needlegrass			W

Forbs (including some low fibrous or half-woody species)

Acla	Achillea lanulosa	western yarrow			W
Agcu	Agoseris cuspidata	wavyleaf agoseris (prairie-dandelion)		¢	O
Ante	Antennaria spp.	pussytoes species		O	W
Apsp	Aplopappus (Haplopappus) spinulosus	ironplant (spiny) goldenweed (burrowweed)		O	P
Aqui	Aquilegia spp.	columbine species		O	W
Arla	Arctium lappa	great burdock	D	U	W
Arin	Argemone intermedia /no SPN/	pricklypoppy	O	U	W
Argn	Artemisia gnaphalodes	cudweed sagebrush (sagewort)			U
Arlu	Artemisia ludoviciana	Louisiana sagebrush (sagewort)			
Ascl	Asclepias spp.	milkweed species			W
Aste	Aster spp.	aster species			O
Astr	Astragalus triphyllus /no SPN/	(tufted milkvetch)	A	¢	O (rare?)

Forbs (including some low fibrous or half-woody species) continued

Basa	Balsamorhiza sagittata	arrowleaf balsamroot				O	W
Bide	Bidens spp.	beggarticks				U	W
Bras	Brassica spp.	mustard species		D	O	U	W
Caap	Calochortus apiculatus /no SPN/	mariposa					O
Cape	Campanula petiolata	American harebell					O
Caro	Campanula rotundifolia	bluebell (harebell)					O
Cear	Cerastium arvense	starry cerastium (prairie chickweed)	A	¢	O	U	W
Chvi	Chrysopsis villosa	hairy goldaster					O
Cirs	Cirsium spp.	thistle species			(O)	(U)	(W)
Ciun	Cirsium undulatum	wavyleaf thistle					O
Clli	Clematis ligusticifolia	western virginsbower (w. white clematis)				O	W
Clse	Cleome serrulata	bee spiderflower (beeplant)			O	U	W
Coum	Comandra umbellata (pallida)	common comandra (c. bastardtoadflax)					¢
Coor	Conringia orientalis	treacle hairsear (hairsearmustard)				¢	U
Coar	Convolvulus arvensis	European glorybind (creepingjenny)		¢	O	U	W
Crsh	Crypantha sheldoni (bradburiana) (Oreocarya glomerata)	Sheldon cryptantha (white forgetmenot)					¢
Debi	Delphinium bicolor	little (low) larkspur		A	¢	O	P
Dome	Dodecatheon meadia	common shootingstar			A	¢	O
Ecan	Echinacea (Brauneria) angustifolia	blacksamson echinacia (purpleconeflower)				¢	O
Ecpa	Echinacea (Brauneria) pallida	pale echinacea (purpleconeflower)					O
Erio	Eriogonum species	eriogonum species (buckwheat)					W
Erla	Eriophyllum lanatum	woolly eriophyllum					
Eras	Erysimum (Cheirinia) asperum	plains erysimum (western wallflower)				¢	O
Frpu	Fritillaria pudica	yellow fritillary (yellowbell)				A	O
Gaar	Gaillardia aristata	common perennial gaillardia (blanketflower)				¢	O
Gabo	Galium boreale	northern bedstraw				O	W
Gaco	Gaura coccinea	scarlet gaura				O	W
Glle	Glycyrrhiza lepidota	American licorice					W
Grsq	Grindelia squarrosa	curlycup gumweed			D	U	W
Gusa	Gutierrezia sarothrae	broom snakeweed				P	U
Huam	Humulus americanus /noSPN/	American hop					
Lase	Lactuca serriola (L. scariola)	prickly (China) lettuce					
Lare	Lappula redowski (L. occidentalis) /no SPN/	stickseed (beggarticks) (sticktight)				U	W

Forbs (including some low fibrous or half-woody species) continued

Lemo	Leucocrinum montanum	common starlily (mountainlily)			A	¢	O	W	
Lipu	Liatris punctata	dotted gayfeather (blazingstar)						O	
Lile	Linum lewisi	Lewis (prairie) flax					¢	O	
Lian	Lithospermum angustifolium (incisum)(L. linearifolium)	narrowleaf gromwell (puccoon)				¢	O	W	
Loma	Lomatium (Cogswellia) spp.	lomatium species (includes biscuitroots)					(O)	(W)	
Lofo	Lomatium foeniculaceum /no SPN/	(yellow wildparsley)						O	
Loor	Lomatium orientale /no SPN/	(wildparsley)						O	
Lupi	Lupinus spp.	lupine species				O	(P)	(W)	
Luar	Lupinus argenteus	silvery lupine			A	¢	O	P	
Lyju	Lygodesmia juncea	rush skeletonplant (skeletonweed)				¢	U	P	
Lypu	Lygodesmia puntate /sp. not in SPN/	skeletonplant (skeletonweed)				¢	U	P	
Mare	Mahonia (Berberis) repens	creeping mahonia ("Oregongrape")				O	P	W	
Meli	Melilotus spp.	sweetclover species						W	
Meof	Melilotus officinalis	yellow sweetclover				¢	D	W	
Ment	Mentha spp.	mint species							
Mela	Mertensia lanceolata	lanceleaf bluebells (lungwort)					¢	O	
Oese	Oenothera serrulata /no SPN/	halfshrub sundrop, shrubby eveningprimrose						O	
Opun	Opuntia spp.	pricklypear species							
Oppo	Opuntia polyacantha	plains pricklypear				¢	O	W	
Oxyt	Oxytropis spp.	crazyweed species (also pointvetches)				O	(P)	(W)	
Pent	Penstemon (Pentstemon) spp.	penstemon (beardtongue) species					O	(W)	
Peni	Penstemon nitidus	waxleaf penstemon (beardtongue)					¢	O	
Phho	Phlox hoodi	Hoods phlox				¢	O	W	
Phlo	Physalis longifolia /not in SPN/	ground cherry							
Phbr	Physaria brassicoides/not in SPN/	double bladderpod					¢	O	(rare?)
Plan	Plantago spp.	plantain species					(U)	(W)	
Plpu	Plantago purshi	woolly Indianwheat (woolly plantain)					U	W	
Poco	Polygonatum commutatum	great solomonseal				A	O	W	
Posa	Polypogon sawatchense	sawatch knotweed							
Psor	Psoralea spp.	scurfpea species						(W)	
Psla	Psoralea lanceolata	lemon scurfpea					A	¢	
Ranu	Ranunculus spp.	buttercup species	A	(D)	O	(P)	(U)	(W)	
Raco	Ratibida (Lepachys) columnaris (columnifera)	upright prairieconeflower						O	

Forbs (including some low fibrous or half-woody species) continued

Rume	Rumex spp.	dock species (includes sorrels)					(W)
Sitr	Sieversia (Geum) triflora /not in SPN/	(oldmanswhiskers, torchflower) sieversia				¢	O
Sial	Sisymbrium altissimum	tumblemustard			¢	U	W
Soli	Solidago spp.	poldenrod species					
Spco	Sphaeralcea coccinea (Malvastrum coccineum)	scarlet globemallow				O	W
Taof	Taraxacum officinale	common dandelion			D	U	W
Thrh	Thermopsis rhombifolia	plains thermopsis (goldenpea)			A	¢	O
Trdu	Tragopogon dubius /sp. not SPN/	(large) salsify (large goatsbeard)					U
Trif	Trifolium spp.	clover species					W
Urdi	Urtica dioica	bigsting (stinging) nettle			D	P	U
Vici	Vicia spp.	vetch species			O	(U)	(W)
Viol	Viola spp.	violet species				O	(W)
Vinu	Viola nuttalli	Nuttall violet			A	¢	O
Yugl	Yucca glauca	small soapweed (yucca)				¢	O
Ziga	Zigadenus (Zygadenus) spp.	deathcamas species	A	¢	O	(P)	(W)
Aigr	Zigadenus gramineus	grassy deathcamas		A	¢	O	P

Shrubs and Trees

Acne	Acer negundo (Negundo aceroides)	boxelder					W
Arca	Artemisia cana	silver sagebrush					W
Arfr	Artemisia frigida	fringed sagebrush (sagewort)		D	O	U	W
Argl	Artemisia glauca /no SPN/	(green sagebrush)					
Argn	Artemisia gnaphalodes	cudweed sagebrush (sagewort)					U
Arlu	Artemisia ludoviciana	Louisiana sagebrush (sagewort)					U
Artr	Artemisia tridentata	big sagebrush					W
Cost	Cornus stolonifera	redosier dogwood				O	W
Cret	Crataegus spp.	hawthorn (thornapple) species					W
Crco	Crataegus columbiana /not in SPN/	(Columbian) hawthorn					O
Crch	Crataegus chrysocarpa (rotundifolia)	fireberry hawthorn					O
Frla	Fraxinus pennsylvanica lanceolata	green ash					

Shrubs and Trees (continued)

Cusa	Gutierrezia sarothrae	broom snakeweed	¢	O	P	U
Juco	Juniperus communis	common juniper			¢	W
Juho	Juniperus horizontalis	creeping juniper			¢	W
Jusc	Juniperus scopulorum	Rockymountain juniper				W
Mare	Mahonia (Berberis) repens	creeping mahonia ("Oregongrape")		O	P	W
Oese	Oenothera serrulata /no SPN/	halfshrub sundrop, shrubby eveningprimrose				O
Pisc	Pinus ponderosa scopulorum	Rockymountain ponderosa pine				W
Posa	Populus sargenti	plains poplar (cottonwood)		A	¢	W
Pram	Prunus americana	American plum			O	W
Prvi	Prunus virginiana	common chokecherry			O	W
Rhtr	Rhus trilobata	skunkbush sumac				W
Riam	Ribes americanum	American black currant				
Riod	Ribes odoratum (Chrysobotrya odorata)	clove currant (golden currant)				O
Rise	Ribes setosum (Grossularia setosa)	redshoot gooseberry				
Rosa	Rosa spp.	rose species			O	(W)
Roar	Rosa arkansana	Arkansas (prairie) rose		A	¢	O
Rowo	Rosa woodsi	Woods rose		A	¢	O
Sali	Salix spp.	willow species				(W)
Symp	Symphoricarpos	snowberry species			(O)	W
Syal	Symphoricarpos albus	common snowberry		A	O	W
Syoc	Symphoricarpos occidentalis	western snowberry	A	¢	O	W

Additions to Plant List from Spring Survey

Grasslike Plants

Juba	Juncus balticus	Baltic rush					W

Grasses

Agde	Agropyron desertorum/not in SPN/	desert (standard crested) wheatgrass					
Aggr	Agropyron griffithsi	Griffiths wheatgrass					
Besy	Beckmannia syszigachne	American sloughgrass					
Brin	Bromus inermis	smooth brome					
Brja	Bromus japonicus	Japanese brome (chess), (wintergrass)				U	
Orhy	Oryzopsis hymenoides	Indian ricegrass (Indian millet, sandgrass, sandrice, silkygrass)					W
Pose	Poa secunda	Sandberg (little, western) bluegrass					W

Forbs (including some low fibrous or half-woody species)

Alte	Allium textile	textile onion					
Amar	Ambrosia artemisifolia (elatior)	common (low) ragweed	D		P	U	W
Anro	Antennaria rosea	rose pussytoes		0			
Asgi	Astragalus gilviflorus (triphyllus)/no SPN/	three leaved (white tufted) milkvetch		0			
Aspu	Astragalus purshi	Pursh lock (woolypod milkvetch)		0			
Bewy	Besseya (Synthyris) wyomingensis	Wyoming kittentails					
Case	Castilleja sessiliflora/not in SPN/	downy paintedcup (Indian paintbrush)		0			

Additions to Plant List from Spring Survey (cont.)

Ditr	Disporum trachycarpum	wartberry (roughfruited) fairybells	0			
Doco	Dodecatheon conjugens	/no SPN/ shootingstar	0			
Eppa	Epilobium paniculatum	autumn willowweed (panicled willowherb)	0			
Eran	Eriogonum annum	annual eriogonum				
Eugl	Euphorbia glyptosperma	ridgeseed euphorbia (spurge)				W
Euro	Euphorbia robusta	robust euphorbia				
Getr	Geum triflorum	prairiesmoke, torchflower, or oldmanswhiskers	0			
	/not in SPN, but is either the same or very similar to Sieversia ciliata/					
Labi	Lathyrus bijugatus	/no SPN/ pinewoods peavine (sweetpea, vetchling)				
Meal	Melilotus alba	white sweetclover		P		W
Mesp	Mentha spicata	spear mint (mackerel mint)	0			W
Mela	Mentzelia laevicaulis	blazingstar mentzelia (fivepetal blazingstar)	0			
Micu	Microseris (Agoseris) cuspidata	wavyleaf agoseris (prairiedandelion, false-dandelion)	0			
Mudi	Musineon divaricatum /not in SPN/	wildparsley	0			
Oxse	Oxytropis (Aragallus) sericea	silky (whitepoint) crazyweed (pointvetch)	0	P		
Poav	Polygonum aviculare	prostrate knotweed (doorweed)			U	
Psar	Psoralea argophylla	silverleaf scurfpea	0	P		W
Pste	Psoralea tenuiflora	slimflower scurfpea, (wildalfalfa)	0			
Rahy	Ranunculus hyperboreus/not in SPN/	high-northern (arctic) buttercup	0			

Additions to Plant List from Spring Survey (cont.)

			(D)	(O)	(P)	(U)	(W)
SENE	Senecio spp.	groundsel (ragwort) species					
Smst	Smilacina stellata	starry solomonplume (false solomonseal)		0			W
Vica	Viola canadensis	Canada violet		0			
Zipa	Zigadenus (Zygadenus) paniculatus	foothill deathcamas		0	P		
Shrubs and Trees							
Chna	Chrysothamnus nauseosus	rubber rabbitbrush	D	0			
Crdo	Crataegus douglasi	Douglas (black) hawthorn		0			
Rice	Ribes cereum	wax (squaw) currant		0			
Rihu	Ribes hudsonianum	Hudsonbay (Hudson) currant					

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Appendix C TRACT III TIMBER ACREAGE AND VOLUME DATA

	Approximate Acreage
1a - Total area, Tract III	14,746
1b - Timber area	5,900
2a - Westmoreland surface ownership	6,600
2b - Timber area owned by Westmoreland (May 1973)	1,800
3a - Timber sale area (Botts/Westmoreland Contract)	860
3b - Timber area within gross sale area, including area cleared for actual mining operations	200
4a - Estimated timber volume, Tract III - 18 MMBM	
4b - Estimated timber volume, Westmoreland ownership - 6 MMBM	
4c - Estimated volume within Botts/Westmoreland contract area - 900 MBM	
4d - Estimated volume to be harvested within Botts/Westmoreland contract area - 400-500 MBM	

1a and 1b - Data from BC Report (Timber area 40% of total area within Tract III)

2a - Data from ownership received by phone from Westmoreland May 21, 1973, and gross area calculated by GLO subdivision with timber area determined by dot grid from BC maps.

3a - Timber sale area from Botts/Westmoreland contract and confirmed by dot grid, timber area within gross sale area determined by dot grid.

4a-d Data re timber volumes are not available; our estimate based on visual inspection of the area and on gross and harvest volumes from similar timber stands on nearby Crow and Northern Cheyenne Reservations.

APPENDIX D

WILDLIFE SPECIES INVENTORY

A. Bird Species

	Common Name	Scientific Name
1.	Mallard	Anas platychynchos
2.	Green-winged teal	Anas carolinensis
3.	Turkey vulture	Cathartes aura
4.	Sharp-shinned hawk	Accipiter striatus
5.	Cooper's hawk	Accipiter cooperii
6.	Red-tailed hawk	Buteo jamaicensis
7.	Swainson's hawk	Buteo swainsoni
8.	Rough-legged hawk	Buteo lagopus
9.	Ferruginous hawk	Buteo regalis
10.	Golden eagle	Aquila chrysaetos
11.	Bald eagle	Haliaeetus leucocephalus
12.	Marsh hawk	Circus cyaneus
13.	Prairie falcon	Falco mexicanus
14.	Peregrine falcon*	Falco peregrinus
15.	Sparrow hawk	Falco sparverius
16.	Sharp-tailed grouse	Pediocetes phasianellus
17.	Sage grouse	Centrocercus urophasianus
18.	Ring necked pheasant	Phasianus colchicus
19.	Gray partridge	Perdix perdix
20.	Turkey	Meleagris gallopavo
21.	Killdeer	Charadrius vociferus
22.	Mourning dove	Zenaidura macroura
23.	Great horned owl	Bubo virginianus
24.	Long-eared owl	Asio otus
25.	Short-eared owl	Asio flammeus
26.	Screech owl	Otus asio
27.	Common nighthawk	Chordeiles minor
28.	Belted kingfisher	Megaceryle alcyon
29.	Yellow-shafted flicker	Colaptes auratus
30.	Red-shafted flicker	Colaptes cafer
31.	Hairy woodpecker	Dendrocopos villosus
32.	Downy woodpecker	Dendrocopos pubescens
33.	Eastern kingbird	Tyrannus tyrannus
34.	Western kingbird	Tyrannus verticalis
35.	Say's phoebe	Sayornis saya
36.	Traill's flycatcher	Empidonax traillii
37.	Western flycatcher	Empidonax difficilis
38.	Western wood pewee	Contopus sordidulus
39.	Olive-sided flycatcher	Nuttallornis borealis
40.	Horned lark	Eremophila alpestris

* Endangered species

A. Bird Species (cont.)

	Common Name	Scientific Name
41.	Barn swallow	Hirundo rustica
42.	Cliff swallow	Petrochelidon pyrrhonota
43.	Tree swallow	Iridoprocne bicolor
44.	Gray jay	Perisoreus canadensis
45.	Common raven	Corvus corax
46.	Common crow	Corvus brachyrhynchos
47.	Black-billed magpie	Pica pica
48.	Black-capped chickadee	Parus atricapillus
49.	Mountain chickadee	Parus gambeli
50.	White-breasted nuthatch	Sitta carolinensis
51.	Red-breasted nuthatch	Sitta canadensis
52.	House wren	Troglodytes aedon
53.	Catbird	Dumetella carolinensis
54.	Brown thrasher	Toxostoma rufum
55.	Sage thrasher	Oreoscoptes montanus
56.	Robin	Turdus migratorius
57.	Western bluebird	Sialia mexicana
58.	Mountain bluebird	Sialia currucoides
59.	Cedar waxwing	Bombycilla cedrorum
60.	Northern shrike	Lanius excubitor
61.	Starling	Sutrnus vulgaris
62.	Black and White warbler	Mniotilta varia
63.	Tennessee warbler	Vermivora peregrina
64.	Myrtle warbler	Dendroica coronata
65.	Blackpoll warbler	Dendroica striata
66.	Townsend's solitaire	Myadestes townsendi
67.	House sparrow	Passer domesticus
68.	Western meadowlark	Sternella neglecta
69.	Red-winged blackbird	Agelaius phoeniceus
70.	Brown-headed cowbird	Molothrus ater
71.	Western tanager	Piranga ludoviciana
72.	Evening grosbeak	Hesperiphena vespertina
73.	Purple finch	Carpodacus purpureus
74.	Pine siskin	Spinus pinus
75.	Lark bunting	Calamospiza melanoeorys
76.	Vesper sparrow	Pooecetes gramineus
77.	Lark sparrow	Chondestes grammacus
78.	Slate-colored junco	Junco hyemalis
79.	Oregon junco	Junco oreganus
80.	Grasshopper sparrow	Ammodramus savannarum

A. Bird Species (cont.)

	Common Name	Scientific Name
81.	Chipping Sparrow	Spizella passerina
82.	White-crowned sparrow	Zonotrichia leueophrys
83.	Song sparrow	Melospiza melodia
84.	McCown's larkspur	Rhynchophanes mecownii
85.	Chestnut-collared longspur	Calcarius ornatus
86.	Green-tailed towhee	Chlorura chlorura

B. Mammals

	Common Name	Scientific Name
1.	Masked shrew	Sorex cinereus
2.	Merriam's shrew	Sorex merriami
3.	Little brown bat	Myotis lucifugus
4.	Big brown bat	Eptesicus fuscus
5.	Silver-haired bat	Lasionyeteris noctivagans
6.	Hoary bat	Lasiurus cinereus
7.	Short-tailed weasel	Mustela erminea
8.	Long-tailed weasel	Mustela frenata
9.	Mink	Mustela vison
10.	Stripped skunk	Mephitis mephitis
11.	Badger	Taxidea taxus
12.	Raccoon	Procyon lotor
13.	Coyote	Conis latrans
14.	Red fox	Vulpes fulva
15.	Bobcat	Lynx rufus
16.	Yellowbelly marmot	Marmota flaviventris
17.	Thirteen-lived ground squirrel	Citellus tridecemlineatus
18.	Richardson ground squirrel	Citellus richardsoni
19.	Least chipmunk	Eutamias minimus
20.	Northern pocket gopher	Thomomys talpoides
21.	Wyoming pocket mouse	Perognathus fasciatus
22.	Ord kangaroo rat	Dipodomys ordi
23.	Northern grasshopper mouse	Oncyhomys leucogaster
24.	Hispide pocket mouse	Perognathus hispidus
25.	Western harvest mouse	Reithrodontomys megalotis
26.	Deer mouse	Peromyscus maniculatus
27.	White-footed mouse	Peromyscus leucopus
28.	Beaver	Castor canadensis
29.	Bushytail woodrat	Neotoma cinera
30.	Meadow vole	Microtus pennsylvanicus
31.	Longtail vole	Microtus longicaudus
32.	Prairie vole	Microtus ochrogaster
33.	Sagebrush vole	Lagurus curtatus
34.	Meadow jumping mouse	Zapus hudsonius
35.	Porcupine	Erethizon dorsatum
36.	White-tailed jackrabbit	Lepus townsendi
37.	Desert cottontail	Sylvilagus auduboni
38.	Mountain cottontail	Sylvilagus nuttalli
39.	Eastern cottontail	Sylvilagus floridanus
40.	Muskrat	Ondatra zibethica
41.	Mule deer	Odocoileus hemionus
42.	White-tailed deer	Odocoileus virginianus
43.	Pronghorn antelope	Antilocapra americana

C. Reptiles and Amphibians

	Common Name	Scientific Name
1.	Rocky Mountain toad	Bufo woodhousei
2.	Prairie rattlesnake	Crotalus viridus
3.	Racer	Coluber constrictor
4.	Western hognose snake	Heterodon nasicus
5.	Boreal chorus frog	Pseudacris triseriata
6.	Leopard frog	Rana pipiens
7.	Tiger salamander	Ambystoma tigrinum
8.	Plains spadefoot	Scaphiopus bombitrons
9.	Sagebrush lizard	Sceloporus graciosus
10.	Short horned lizard	Phrynosoma douglassi
11.	Painted turtle	Chrysemys picta
12.	Gopher snake	Pituophis melanoleucus
13.	Common garter snake	Thamnophis sirtalis
14.	Plains garter snake	Thamnophis radix

Appendix E

Table of Geologic Formations and Their Hydrologic Properties In the Sarpy Creek and Tullock Creek Drainages

System and Formation	Member	Approximate Thickness (feet)	Water Supply Capability
Quaternary			
Allvuium		Less than 60	Alluvium present along the major water courses is water-bearing and yields small quantities of water to wells and springs. Larger well yields may be obtainable where more extensive sand and gravel beds or lenses are present. Water quality is fair to poor and consists of calcium, magnesium and sodium sulfate and sodium bicarbonate types. The water is high in hardness.
Tertiary			
Fort Union	Tongue River	± 1650 (approximately ± 300' present on Tract III)	Sandstone and coal beds are water-bearing. They yield small quantities of water to wells and springs. Water quality is fair to poor. Chemical constituents of the water ranges from calcium and magnesium sulfates, to that contained in the alluvium. The water is generally high in hardness.
	Lebo shale	± 100	Sandstone or coal beds may yield some water to wells although the formation is not considered to be an aquifer. Water is usually very poor in quality and is of the sodium bicarbonate and sodium sulfate types.
	Tullock	± 300	Sandstone beds furnish small (Tullock) to moderate (Hell Creek) supplies of water to wells. Water quality is fair to poor. Near the formation outcrop, calcium and magnesium sulfate and hardness prevail; while at greater depth sodium bicarbonate and sodium sulfate type water containing low hardness predominates.
Cretaceous			
Hell Creek		± 600	

Table of Geologic Formations and Their Hydrologic Properties In the Sarpy Creek and Tullock Creek Drainages

System and Formation	Member	Approximate Thickness (feet)	Water Supply Capability
Bearpaw shale		± 600	Relatively impermeable. Weathered part may contain some water, but probably the quantity would be small and the water highly mineralized.
Parkman sandstone		± 250	Wells that tap the basal sandstone yield adequate supplies of water: but toward the north, where mudstone is present, yields are smaller and the water is more mineralized.
Cody shale		± 2,600	Small supplies of mineralized water can be obtained from the weathered shale.
Frontier		± 250	Upper part may yield small amounts of water; lower part is not water-bearing.
Mowry shale		± 300	Possibly would yield small amounts of mineralized water.
Thermopolis shale		± 550	Nearly impermeable. Would yield little or no water to wells.
Cloverly		± 200	Yields moderate to large supplies of water to wells that tap the lower part of the formation. Water is under artesian pressure and wells in favorable topographic locations will flow. Water is mineralized but is suitable for stock, domestic, and limited irrigational use.
Jurassic			
Morrison		± 150	Yields small quantities of water to wells tapping the more permeable beds.
Ellis group		± 700	Possibly would yield small quantities of water to wells.

Appendix E (cont.)

Table of Geologic Formatins and Their Hydrologic Properties
In the Sarpy Creek and Tullock Creek Drainages

System and Formation	Member	Approximate Thickness (feet)	Water Supply Capability
Triassic-Permian			
Chugwater		± 350	Relatively impermeable.
Pennsylvanian			
Tensleep sandstone		± 50	Yields moderate to large supplies of water to wells that tap thick sections of the formation.
Amsden		± 250	Large yields of water reportedly are obtained where rocks are brecciated or limestone is cavernous
Mississippian			
Madison limestone		± 700	Formation contains numerous caverns, open joints, and fissures, and is the most prolific water-bearing formation underlying the area. Water quality is unknown, but may be potable. Water probably high in calcium-sulfate and hardness.

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(1) Range in water quantity may be defined as:

Small - 0 - 25 gpm
Moderate - 25 - 100 gpm
Large - + 100 gpm

(2) Range in water quality may be defined by the following:

Good - 0 to 500 mg/l of total dissolved solids
Fair - 500 to 1500 mg/l of total dissolved solids
Poor - > 1500 mg/l of total dissolved solids

APPENDIX F

WELL RECORDS FOR
WESTMORELAND RESOURCES TRACT III

WELL NUMBER	OWNER OR NAME	YEAR DRILLED	TOTAL WELL DEPTH (ft)	WELL DIA-METER (in.)	WATER USE *	ALTITUDE OF LAND SURFACE	WATER LEVEL BELOW LAND SURFACE (ft)	ALTITUDE OF WATER TABLE	GEO-** LOGIC UNIT	WELL PRODUCTION (GPM)
C1N 37E 13ACAB	REDDING, JOHN					3355	36	3319	LEBO	
C1N 37E 14ACCC	FARLEY		130		S	3395	59	3336	LEBO	5
C1N 37E 15BAAC	FARLEY					3280	39	3241	LEBO	
C1N 37E 15BBCA	FARLEY	1971	140		H	3255	16	3239	LEBO	10
C1N 37E 21ACDD	WESTMORELAND		30		U	3290	9	3281	LEBO	5
C1N 37E 22BDAD	FARLEY	1972			S	3300			LEBO	5
C1N 37E 23DDCD	FARLEY	1965	80		S	3500	40	3460	RC	3
C1N 37E 24CACC	REDDING, JOHN		8	48	U	3549	5	3544	RMCL-OB	
C1N 37E 26ABDC	WESTMORELAND	1956	123		U	3410	40	3370	ALLUVIUM (?)	5
C1N 37E 27BDCD	WESTMORELAND		30		U	3345	9	3336	ALLUVIUM	
C1N 37E 35CBCB	WESTMORELAND				S	3380			ALLUVIUM	
C1N 38E 19BCCC	COX, MERLE		160			3463	24	3439	RC	
C1N 38E 19CDDB	REDDING, JOHN		91		U	3450	36	3414	RC	
C1N 38E 22CCC	JOHN REDDING		30		U		5		ALLUVIUM	10
C1N 38E 28AAA	JOHN REDDING	1972			H					30
C1N 38E 29ADCA	JOHN REDDING					3473			RMC	5
C1N 38E 29ADCA	JOHN REDDING	1970	100		H	3482	30	3452	RMC	
C1N 38E 29ADDA			20			3440	0	3440	ALLUVIUM (?)	5
C1N 38E 29CABD	COX, MERLE		45			3490			RMC	5
C1N 38E 30DDAD	KENNETH JOHN				I				RMC	5
C1N 38E 30DDBD	KENNETH JOHN		50		U	3528	23	3505	RMC	3
C1N 38E 31CCCC	CRUM, GEORGE		165		H	3534	70	3464	RC	
C1N 38E 32BBAA	COX, MERLE		15		S	3490	6	3484	ALLUVIUM (?)	
C1N 38E 32BBBD						3530				
C1N 38E 32BBCA	COX, MERLE		225		S	3530	128	3402	RC	6
C1N 38E 32CCDD	COX, MERLE	1972	164	6		3620	74	3546		
C1S 38E 03CACC	COX, MERLE		180		S	3652	80	3572	RMCL-OB	
C1S 38E 05DBCB	CRUM, GEORGE		83		U	3468	56	3407	LEBO	
C1S 38E C5DDB	CRUM, GEORGE		44		U	3480	13	3467		
C1S 38E 09ACBB	GEORGE CRUM	1969	120		S	3517	15	3502	RMC	3
C1S 38E 09BADD	GEORGE CRUM	1964	80		H	3505			RMC	20
C1S 38E 09BDDA			84			3508	4	3504	RMC	3
C1S 38E 09CAAA	CRUM, GEORGE		98			3518	17	3501	RMC	3

* Water Use Key
S - Stock   I - Irrigation   H - House   U - Unused

** Geologic Unit Key
RMCL-OB Rosebud-McKay Clinker or Overburden Aquifer
RMC Rosebud-McKay Coal Aquifer
RC Robinson Coal Aquifer

SPRING RECORDS FOR
WESTMORELAND RESOURCES TRACT III

SPRING	NUMBER	OWNER OR TENANT	USE OF WATER	ALTITUDE OF SPRING	GEOLOGICAL SOURCE*
01N 37E	13CCAD	REDDING, JOHN		3430	RMC
	14CCDC	FARLEY		3420	
	16DDDD	FARLEY		3290	
	22CBCC	WESTMORELAND		3290	ALLUVIUM
	24DADD	REDDING,JOHN		3470	
	26ABBB	WESTMORELAND		3425	RC
	26DAAB	WESTMORELAND		3467	RMC
	35DBBB	WESTMORELAND		3435	
	36BDCA	STATE	S	3497	RMC
	36DBBB	STATE	S	3477	
01N 38E	19BCDC	COX,MERLE	S	3440	RMC
	19CBBC	REDDING,JOHN		3420	RMC
	19CCAC	COX,MERLE	S	3445	RMC
	19DCDB	REDDING,JOHN		3468	RMC
	29ACDC	REDDING,JOHN		3460	
	29DBBB	COX,MERLE	S	3470	RMCL-OB
	29DBCC	COX,MERLE	S	3465	RMCL-OB
	30BADB	REDDING,JOHN	S	3460	
	30BBBA	COX,MERLE	S	3465	RMCL-OB
	30BCCC	REDDING,JOHN	S	3560	
	30DADD	JOHN,KENNETH	S	3520	RMCL-OB
01S 38E	02BBCB	COX,MERLE	S	3650	
	03ACDB	COX,MERLE	S	3575	RMCL-OB
	03DBAB	COX,MERLE	S	3592	RMCL-OB
	03DBDB	COX,MERLE	S	3625	RMCL-OB
	03DBDB	COX,MERLE	S	3615	RMCL-OB
	04SWQ	CRUM,GEORGE	S	3460	
	05SEQ	CRUM,GEORGE	S	3480	

* Geological Source Key
RMCL-OB - Rosebud-McKay Clinker or Overburden Aquifer
RMC - Rosebud-McKay Coal Aquifer
RC - Robinson Coal Aquifer

APPENDIX F (cont.)

ALLUVIAL AQUIFER

Chemical Quality of Water
Data for Wells and Springs
on Westmoreland Resources
TRACT III

WELLS LOCATION	Calcium (mg/1)	Magnesium (mg/1)	Sodium (mg/1)	Iron (mg/1)	Bicarbonate (mg/1)	Sulfate (mg/1)	Total Hardness as $CaCO_3$ (mg/1)	Total Alkalinity as $CaCO_3$ (mg/1)	Dissolved solids (mg/1)	Conductance (mmhos/cm)	pH
WELLS											
IN-37E-21ACDD (LEBO?)	51	183	207	.02	419	943	894	343	1859	2080	7.35
IN-37E-26ABBC(RC?)	45	61	73	39.5	293	345	366	240	904	941	8.1
IN-37E-27BDCB	52	59	458	0	265	1103	377	218	1964	2430	7 4
IN-37E-35CBCB	44	99	55	0	278	390	526	236	903	1089	7.4
IN-38E-22CCC	81	106	235	3.1	439	767	643	360	1655	1960	7.6
IN-38E-29ADDA(RMOB?)	80	146	81	0	486	540	809	398	1358	1520	7 4
IN-38E-32BBAA(RMOB?)	37	45	4.2	0	314	42	281	265	478	540	7.3
SPRINGS											
IN-37E-22CBCC	58	210	338	0	795	1041	1024	652	2487	2590	8.5

ROSEBUD - McKAY, CLINKER OR OVERBURDEN AQUIFERS

LOCATION	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Iron (mg/l)	Bicarbonate (mg/l)	Sulfate (mg/l)	Total Hardness as $CaCO_3$ (mg/l)	Total Alkalinity as $CaCO_3$ (mg/l)	Dissolved solids (mg/l)	Conductance (mmhos/cm)	pH
WELLS											
IN-37E-24CACC	65	66	22	0	444	97	436	364	716	810	7.35
IN-38E-29ADDA (Alluvium ?)	80	146	81	0	486	540	809	398	1358	1520	7.4
IN-38E-32BBAA (Alluvium ?)	37	45	4.2	0	314	42	281	265	478	540	7.3
IS-38E-03CACC	53	64	22	0	358	145	399	293	659	733	7.5
SPRINGS											
IN-38E-29DBBB	75	138	48	.03	668	291	763	548	1249	1340	8.4
IN-38E-29DBCC	131	222	89	0	691	830	1254	566	1998	2060	8.2
IN-38E-30BBBA	198	150	36	.03	372	870	1113	305	1720	1880	8.05
IN-38E-30DADD	24	73	49	0	444	76	365	397	695	742	7.4
IS-38E-03ACDB	126	319	85	.03	427	1383	1650	350	2382	2400	7.7
IS-38E-03DBAB	46	117	28	.02	394	308	604	337	921	1040	8.25
IS-38E-03DBDB	67	172	57	.02	357	690	887	293	1374	1530	8.35
IS-38E-03DBDB	137	154	31	.03	579	510	984	475	1547	1620	7.45

APPENDIX F (cont.)

ROSEBUD-McKAY COAL BED AQUIFER

LOCATION	Calcium (mg/1)	Magnesium (mg/1)	Sodium (mg/1)	Iron (mg/1)	Bicarbonate (mg/1)	Sulfate (mg/1)	Total Hardness as $CaCO_3$ (mg/1)	Total Alkalinity as $CaCO_3$ (mg/1)	Dissolved Solids (mg/1)	Conductance (mmhos/cm)	pH
WELLS											
IN-38E-29ADCA	57	70	22	.05	431	120	435	353	[illegible]	816	7.4
IN-38E-29CABD	49	80	21	0	336	152	454	275	939	834	7 1
IN-38E-30DDAD	55	130	51	0	272	273	680	223	1033	1360	7 3
IN-38E-30DDBD	25	68	23	0	357	86	349	293	581	657	---
IS-38E-09ACBB	70	97	45	2.1	510	238	579	418	982	1060	7.2
IS-38E-09BADD	82	96	62	1.2	433	364	604	355	1066	1230	7.1
IS-38E-09BDDA	104	140	143	0	256	901	843	210	1572	1780	7.15
IS-38E-09CAAA	90	54	182	0	517	441	493	424	1321	1370	7.3
SPRINGS											
IN-37E-13CCAD	138	95	62	.05	222	650	738	182	1225	1450	7.25
IN-37E-26DAAB	72	72	46	0.90	381	257	487	312	906	1010	8.7
IN-37E-36DDCA	5	78	35	0	283	146	339	2,96	592	743	7.25
IN-38E-19BCDC	51	166	97	.02	327	700	824	296	1372	1580	7.2
IN-38E-19CBBC	195	142	61	.02	471	733	1072	386	1690	1770	7.5
IN-38E-19CCAC	225	159	48	.05	339	1002	1220	278	1820	1950	7.3
IN-38E-19DCDB	19	87	22	0	409	78	410	385	659	734	7.9

APPENDIX F (cont.)

ROBINSON COAL BED AQUIFER

LOCATION	Calcium (mg/1)	Magnesium (mg/1)	Sodium (mg/1)	Iron (mg/1)	Bicarbonate (mg/1)	Sulfate (mg/1)	Total Hardness as $CaCO_3$ (mg/1)	Total Alkalinity as $CaCO_3$ (mg/1)	Disssolved solids (mg/1)	Conductance (mmhos/cm)	pH	SAR
WELLS												
IN-37E-23DBCD	122	112	120	10.8	406	676	770	333	1473	1690	7.6	< 10
IN-37E-26ABBC (Alluvium ?)	45	61	73	39.5	293	345	366	240	904	941	8.1	"
IN-38E-19CDDB	14	30	242	.02	360	360	162	311	1020	1210	9.4	"
IN-38E-31CCC	45	43	244	0	420	445	290	360	1225	1470	7.35	"
IN-38E-32BBCA	51	28	480	0	346	951	243	205	1879	2290	7.55	13.4
SPRINGS												
IN-37E-26ABBB	117	105	73	2.7	457	499	728	375	1304	1400	7.35	

APPENDIX F (cont.)

LEBO SHALE OR UPPER TULLOCK MEMBER AQUIFER

LOCATION	Calcium (mg/1)	Magnesium (mg/1)	Sodium (mg/1)	Iron (mg/1)	Bicarbonate (mg/1)	Sulfate (mg/1)	Total Hardness as $CaCO_3$ (mg/1)	Total Alkalinity as $CaCO_3$ (mg/1)	Dissolved solids (mg/1)	Conductance (mmhos/cm)	pH	SAR
WELLS												
IN-37E-14ACCC	162	132	142	0.62	454	820	950	372	1739	2000	7.1	2.6
IN-37E-15BBCA	6	1.6	564	0.05	670	635	22	611	1919	2320	8.39	52.3
IN-37E-21ACDD(Alluvium)	51	183	207	0.02	419	943	894	343	1859	2080	7.25	3.1
IN-37E-22BBAD	76	415	415	1.8	443	859	362	363	1860	2230	7.6	9.5

MADISON LIMESTONE (MISSION CANYON) AQUIFER

LOCATION	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Iron (mg/l)	Bicarbonate (mg/l)	Sulfate (mg/l)	Total Hardness as $CaCO_3$ (mg/l)	Total Alkalinity as $CaCO_3$ (mg/l)	Dissolved solids (mg/l)	Conductance (mmhos/cm)	pH	SAR
WELL												
1N-37E-26D	309	60	44	6.7	136	980	--	--	1540	--	6.6	0.4

APPENDIX G DUST CLOUD KINETICS

The Scorer and Barrett relationships cited is an empirical equation developed to approximately determine the concentration of particulate matter from a low level emission at a distance, "s", from the source. It was derived for a point source whereas the haul roads of a strip mine are an area source. The method used will therefore treat each part of the road separately. This introduces an additional source of error into the equation and a factor of safety is provided at the end of the computation to compensate.

1. The Scorer and Barrett relationship is:

$$q = \frac{Q}{0.14s^2u}$$

Where Q = mass emission rate per unit time.

q = mass concentration at point "s" in weight per unit vol.

s = distance from source of emission

u = wind speed

2. The equation holds only for small particles, say in the 10 to 20 micron range, which it is assumed will make up a part of the surface of the haul roads. While the dust from one area of the road will add to the density of dust from the next, it will only travel a prescribed distance, s , from its source. In other words, while the density is additive, the distance the dust will travel will not be. It is assumed an area of 10 meters square can be treated as a source.

It is further assumed that the depth effected on the surface during one second's time is two centimeters. For the worst condition, it is assumed that a very dense cloud will leave the dry, loose surface, say 1,000,000 μg/m^3.

Therefore:

Q = mass per unit time

= volume effected per unit time x mass per unit vol.

= 100 m^2 x 0.02 meters/sec. x 1 x 10^6 μg/m^3

= 2,000,000 μg/sec.

3. It is necessary to reach a concentration meeting the EPA standard of 60 μg/m^3

Therefore:

$$q = 60\,\mu g/m^3$$

4. Assume the wind velocity is 20 mph. If it were much greater, turbulance associated with the ground surface and thus dispersion, would also be greater and the dust cloud would break up much quicker (note that the velocity appears in the denominator). If it were less, it could never move such a dense cloud.

Therefore:

$$u = 20 \text{ mph} \times 0.447 = 8.94 \text{ m/sec.}$$

5. It is necessary to determine how far dust will travel before it disperses to a point at which it meets EPA standards.

Therefore:

s = unknown, or solving the equation for s:

$$s^2 = \frac{Q}{0.14\ qu} \quad \text{and} \quad s = \sqrt{\frac{Q}{0.14\ qu}}$$

6. Computations:

$$s = \sqrt{\frac{2,000,000}{0.14 \times 60 \times 8.94}} = \sqrt{26,600}$$

$$s = 165 \text{ meters} \qquad = 580 \text{ feet}$$

7. As pointed out, this method is very approximate. To compensate for errors in the relationship, assume it can be wrong by a factor of 3.

Therefore:

$$580 \times 3 = 1,720 \text{ feet}$$

Thus the dust cloud should fall within the EPA secondary standard for particulate matter within one-half mile of the source.

Appendix H Effect of Westmoreland Coal on Customer's SO_2 Emissions at Selected Plants 1/

Company and Plant	2/ Capacity Kilowatts	2/ Present Coal Usage tons/yr.	2/ Present Sulfur Content Percent	Approximate Blend Ratio Westmoreland to Present Coal	Calculated Coal Usage Based on BTV/lb. basis only	Calculated Final Sulfur Content Percent	Present Calculated SO_2 Emissions tons/yr.	Projected Calculated SO_2 Emissions tons/yr.
Northern States Power Company, Allan S. King Plant, Bayport, Minnesota	560,000	1,500,000	3.2	70:30	1,783,500	1.47	96,000	52,400
Wisconsin Power & Light, Nelson Dewy Plant, Cassville, Wisconsin	214,000	638,000	3.5	40:60	701,800	2.4	44,660	32,000
Interstate Power Company								
(1) Lansing Plant, Lansing, Iowa	62,000	170,000	3.0	30:70	179,000	2.3	10,200	8,200
(2) Dubuque Plant, Dubuque, Iowa	87,500	180,000	3.0	30:70	192,000	2.3	10,800	8,800
(3) M.L. Kapp Plant, Clinton, Iowa	238,500	600,000	3.0	30:70	650,000	2.3	36,000	29,000

1/ The locations shown are only those for which the midwestern to Montana coal blend can be estimated and those which are not merely substituting Westmoreland coal for Colstrip coal. These latter plants are owned by Northern States Power Company and are the Black Dog, High Bridge, and Riverside Plants.

2/ Data furnished by Power Companies.

Appendix I Trace Element Analysis of Coal Seams, Soils, and Surface Water of Westmoreland Sarpy Creek Mining Area.

CT&E Co.

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

SINCE 1908

ADDRESS REPLY TO:
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December 17, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
Department of Interior
Federal Building
Billings, Montana 59101

Dear Mr. Stephens:

You have apparently asked Westmoreland Resources to review its trace element analyses, particularly in light of a report by Bertine and Goldberg, wherein trace element values for coals were listed in a table.

The values listed in the Bertine and Goldberg report were obtained, to our knowledge, from analyses of other than Western coals. The authors of the report emphasized the need for more detailed studies and, as an example, indicate that "Joensuu has measured the Hg contents of 36 U.S. coals and found an average of 3.3 parts per million, about 300 times the literature value used in Table 1. This figure is most probably a better estimate as a result of the very careful analytical procedures which took into account the ready volatility of Hg." In other words, it does not appear that the trace element values in the Bertine and Goldberg report provide a proper basis of comparison with the Sarpy Creek coals, or Western coals for that matter.

Therefore, we are submitting the following trace element analyses for comparative purposes and to supply you with requested information.

TABLES

1. Selected Trace Element Concentrations in coals sampled in the Sarpy Creek Area.
2. Trace Elements of coal within Tract III - Hole #403
3. Trace Elements of coal within Tract III - Hole #414
4. Trace Elements of coal within Tract III - Hole #12C

Charter Member

Chicago, Illinois • Charleston, W. Va. • Clarksburg, W. Va. • Cleveland, Ohio • Morgantown W. Va. • Norfolk, Va. • Strattanville, Pa. • Terre Haute, Ind. • Toledo, Ohio

In that all of the trace elements analyzed and listed in the above tables were made from samples taken in Tract III or the Sarpy Creek area, we believe they are reasonably representative of Tract III. In each case the method of analysis (spark source mass spectrometry) was identical. All of the samples were taken from drilled core holes and, therefore, sample contamination from this sampling is highly probable in the metal trace element determinations - specifically zinc, nickel, lead and possibly cadmium and cobalt. In regard to variability in high concentrations of fluorine, it is highly probable that the core samples were contaminated with partings or overburden lying directly adjacent to the coal seams (less than .5 feet above or below the seam). Information contained in the Draft Environmental Impact Statement from the Peabody Coal Company mine indicates that these immediately adjacent materials at Sarpy Creek contain fluorine concentrations ranging from 600 to 1,000 ppm.

Various published data, together with coal analytical work performed by C T & E on Western coals and the Sarpy Creek area in particular, leads us to conclude that the analyses indicated in Table 1 is representative of those trace element concentrations to be found in Tract III, excluding fluorine.

To provide a more accurate basis of comparison of Sarpy Creek coals with those presently being utilized by Westmoreland's customers (Northern States Power et al), we are attaching Table 5 as representing southern Illinois coals. This table is more representative of trace elements in coals currently utilized in the market area than those concentrations listed in the Bertine and Goldberg report.

From our analyses and knowledge of trace element determinations, we find no unusual concentrations of trace elements in the coals at Tract III. A comparison of Tables 1 and 5 indicates a markedly lower concentration of trace elements in the Sarpy Creek coals as compared to southern Illinois coals.

The environmental impact at the point of utilization is decidely favorable to the Sarpy Creek coals.

Respectfully submitted,

C. T. & E. COMPANY

Lloyd W. Taylor

Lloyd W. Taylor
Division Manager

Enclosures

TABLE NO. 1

Tabulation of Some Selected Trace Element Concentrations in Coals taken from the Rosebud, Robinson and McKay Seams. Samples are Physical Composites of Five Core Holes Drilled in the Sarpy Creek Area, Big Horn County, near Hardin, Montana. Core Holes Drilled during period of December, 1970 to June, 1971. Concentrations are PPM Weight analysis by Spark Source Mass Spectrometry.

ELEMENT	Sample 72-10490 Rosebud Seam(1)	Sample 72-10491 McKay Seam(2)	Sample 72-10492 Robinson Seam(3)	Calculated Weighted Average
COBALT (Co)	3.60	0.35	1.20	1.85
CADMIUM (Cd)	1.80	0.53	0.69	1.06
VANADIUM (V)	7.70	5.80	5.80	6.51
NICKEL (Ni)	9.00	0.90	9.00	6.65
FLUORINE (F)	130.00	130.00	380.00	215.00
BERYLLIUM (Be)	0.70	2.00	2.00	1.52
MERCURY (Hg)	0.26	0.43	0.35	0.34
LEAD (Pb)	3.60	7.20	1.44	3.91
ARSENIC (As)	3.00	1.00	0.75	1.66
SELENIUM (Se)	0.08	0.30	0.08	0.14
ZINC (Zn)	22.00	33.00	13.00	22.15

(1) Total Footage 86.0' - Average Seam Thickness 17.2' (37.2%)
(2) Total Footage 67.0' - Average Seam Thickness 13.4' (29.0%)
(3) Total Footage 78.0' - Average Seam Thickness 15.6' (33.8%)

Table No. 2 Selected Trace Element Concentrations, Westmoreland Resources - Tract III, Sarpy Creek, Stray #1, Stray #2, Rosebud-McKay, Robinson. Hole No. 403, December, 1970.

	Stray Seam #1	Stray Seam #2	Rosebud-McKay Seam	Robinson Seam	Weighted Average
Cobalt (Co)	12	11	13	8.3	11.32
Cadmium (Cd)	0.43	0.87	2.1	2.1	1.95
Vanadium (V)	48	33	25	11	22.04
Nickel (Ni)	30	30	30	15	25.14
Fluorine (F)	330	340	510	340	436.58
Beryllium (Be)	14	18	1.8	3.7	3.92
Mercury (Hg)	0.03	0.26	0.14	0.07	0.12
Lead (Pb)	6.2	5.7	8.6	2.9	6.47
Arsenic (As)	3.3	20	3.3	0.65	3.38
Selenium (Se)	1.4	1.1	1.1	0.22	0.83
Zinc (Zn)	170	45	45	45	51.13

Table No. 3 Hole No. 414

Cobalt (Co)	11	11	11	5.6	9.39
Cadmium (Cd)	0.66	0.87	0.66	1.7	0.98
Vanadium (V)	22	44	83	11	55.60
Nickel (Ni)	150	15	30	15	31.11
Fluorine (F)	120	110	680	340	509.53
Beryllium (Be)	7.4	7.4	1.8	1.8	2.49
Mercury (Hg)	0.06	0.30	0.07	0.14	0.11
Lead (Pb)	29	14	5.7	2.9	6.71
Arsenic (As)	6.3	17	1.3	2.5	3.00
Selenium (Se)	11	1.8	0.56	0.73	1.27
Zinc (Zn)	22	67	45	22	38.39

Table No. 4 Hole No. 12C

Cobalt (Co)			1.5	1.3	1.43
Cadmium (Cd)			3.9	4.6	4.14
Vanadium (V)			11	11	11.00
Nickel (Ni)			21	21	21.00
Fluorine (F)			120	70	102.74
Beryllium (Be)			0.09	0.20	0.13
Mercury (Hg)			0.18	0.18	0.18
Lead (Pb)			5.4	5.4	5.40
Arsenic (As)			6.5	2.0	4.95
Selenium (Se)			1.4	1.4	1.40
Zinc (Zn)			200	200	200.00

Table No. 5 MARKET AREA CONCENTRATIONS

Occurrence and Distribution of Potentially Volatile Trace Elements in Coal. *Sample No. C-13895 - River King Coal Location: Southern Illinois.

ELEMENT	CONCENTRATION PPM WEIGHT
Cobalt (Co)	2
Cadmium (Cd)	0.5
Vanadium (V)	17
Nickel (Ni)	14
Fluorine (F)	101
Beryllium (Be)	1.5
Mercury (Hg)	0.17
Lead (Pb)	8
Arsenic (As)	2.1
Selenium (Se)	1.9
Zinc (Zn)	56

*Information taken from environmental notes No. 61, Illinois State Survey Report dated April, 1973, Table 12, Pages 32 and 33.

Table No. 6

Selected Trace Element Concentrations in Sample of Colstrip Coal Presently Burned by Northern States Power Co. Tabulations were Provided by Northern States Power Co., except as noted. Date of Sample: January 20, 1972.

ELEMENT	CONCENTRATION PPM WEIGHT
Cobalt (Co)	.4*
Cadmium (Cd)	.2
Vanadium (V)	.38
Nickel (Ni)	1.5
Fluorine (F)	50
Beryllium (Be)	20
Mercury (Hg)	.30
Lead (Pb)	.20
Arsenic (As)	.38
Selenium (Se)	.03
Zinc (Zn)	1.30

*Extracted from EIS on the proposed Montana Power Co. electrical generating plant at Colstrip, Montana, prepared by Dept. of Health and Environmental Sciences (Montana) March 1973.

It should be noted that the above sample was taken from delivered coal, and therefore would suffer from less contamination from the Sarpy Creek samples tabulated in Tables No. 1 and 2, which were from cored samples. Cored samples are generally contaminated thereby producing higher metal trace element tabulations.

Appendix I (cont.) Trace Minerals Analysis of Soils

	Drill Hole #391 11.0'-197.0' (excluding coal seam)	Drill Hole #414 12.0'-243.5' (excluding coal seam)
Alluminum	10+	10+
Boron	.001	.003
Cromium	.030	.030
Copper	.030	.030
Iron	10+	10+
Lead	.001	.002
Manganese	2.478	.029
Nickel	.005	.003
Silicon	10+	10+
Titanium	2.729	3.000
Tungsten	.008	.002
Vanadium	.027	.030
Zirconium	.030	.030
Y	.030	.001
Sodium	.273	.300
Potassium	.077	.455
Barium	.029	.030
Calcium	6.489	4.722
Magnesium	9.228	10+
Strontium	.030	.030

No trace of Mercury, Molybdenum, Selenium or any other metallic elements not listed above. These analyses represent averages for overburden thickness shown. Values given are percentage estimates for the total sample analyzed.

EPA-Type Water Analysis

1. Hardness Total, as $CaCO_3$	932	PPM	10. Cadmium	6.5	PPB
2. Specific Conductance (micromhos/cm @ 25°C)	763		11. Chromium Total	5	PPB
			12. Copper	10	PPB
3. Bromide	A		13. Iron	50	PPB
4. Chloride	15	PPM	14. Manganese	218	PPB
5. Fluoride	.6	PPM	15. Mercury	3.6	PPB
6. Nitrite	A		16. Nickel	10	PPB
7. Sulfate (as Sulfur)	282	PPM	17. Zinc	18	PPB
8. Sulfide (as Sulfur)	A		18. pH	8.2	
9. Aluminum	$<$10	PPB			

NOTE: A - Absent

PPM = Parts Per Million = milligrams per liter
1 PPM equivalent to 0.0001%
PPB = Parts Per Billion = 0.001 milligrams per liter
1 PPB = 0.001 PPM equivalent to 0.0000001%
1 PPM = 1000 PPB

Composite average of monthly samples, April 1973 through August 1973, of surface water from the upper Luther buildings area. This is the closest surface water sampling source to the mining site.

Chemical Analyses of Core Samples, Post-Artificial Weathering Drill Holes 414C

CSMRI No.	Depth, ft From	Depth, ft To	pH Water (1)	pH 0.01M $CaCl_2$ Solution (2)	Soluble Salts Extract Conductivity Millimhos/cm (1)	Soluble Salts Extract Conductivity Millimhos/cm (3)	Sodium Water Soluble (milliequivalents/100 g)	Sodium NH_4 Acetate Soluble (milliequivalents/100 g)	Cation Exchange Capacity (milliequivalents/100 g)	Exchangeable Sodium Percentage (4)
	Drill Hole 414C									
W-1	12.0	40.2	8.52	8.07	0.86	3.77	0.40	0.52	20.4	0.6
W-2	40.2	82.2	8.33	8.13	1.89	16.4	0.49	0.57	10.7	0.7
W-3	82.0	87.9	7.95	7.66	2.23	11.8	0.45	0.50	12.8	0.4
W-4	92.0	94.9	8.49	8.00	0.86	3.12	0.47	0.74	27.8	1.0
W-5	94.9	107.0	8.15	8.08	0.70	3.56	0.43	0.52	13.3	0.7
W-6	107.0	119.5	7.99	7.82	0.78	3.01	0.87	1.22	24.4	1.4
W-7	151.5	154.9	8.74	7.87	0.44	1.70	1.13	2.70	10.5	15.0
W-8	159.1	167.9	8.46	7.93	1.38	4.46	2.44	4.57	15.9	13.4
W-9	167.9	178.7	8.64	8.29	0.70	4.86	1.22	1.30	5.0	1.6
W-10	178.7	210.8	8.76	8.21	0.78	2.42	1.83	5.05	14.0	23.0
W-11	210.8	215.2	8.77	8.26	0.70	1.21	3.22	8.01	31.3	15.3
W-12	233.6	243.5	9.07	8.06	0.70	2.61	1.74	4.00	13.1	17.3

Chemical Analyses Weighted Composites of Overburden and Interburden, Drill Hole 414C Artificially Weathered Sample Material

Composite	pH Water	pH 0.01M $CaCl_2$ Solution	Soluble Salts Extract Conductivity mmhos/cm	Sodium Water Soluble (milliequivalents/100 g)	Sodium NH_4 Acetate Soluble (milliequivalents/100 g)	Cation Exchange Capacity (milliequivalents/100 g)	Exchangeable Sodium Percentage
W-1 thru W-6 (12.0 ft thru 119.5 ft)	8.09	7.94	1.40	0.43	0.50	12.1	0.6
W-7 thru W-11 (151.5 ft thru 215.2 ft)	8.65	7.91	1.05	1.84	3.70	14.0	13.3
W-1 thru W-6 with 1% $CaSO_4$ $2H_2O$	7.92	7.92	3.00	0.44	0.54	12.2	0.8
W-7 thru W-11 with 1% $CaSO_4$ $2H_2O$	7.83	7.79	3.20	3.00	3.78	12.4	6.3

1/ Sample/Extract Ratio: 1 to 2

2/ Sample/Extract Ratio: 1 to 5

3/ Calculated conductivity for a saturation extract; basis, 1 to 2 ratio conductivity data and 1/3 bar water holding capacity data.

4/ Calculated from the equation: exchangeable sodium percentage = (100)(Na, ammonium acetate soluble - Na, water soluble)/cation exchange capacity.

Appendix K

WESTMORELAND RESOURCES

ESTIMATED JOBS AND PAYROLL

	4.0 Million Tons Annually Number of Jobs
Craft	56
Supervisory, Administrative, and Clerical	34
TOTAL	90
Payroll	$1,500,000

The figures for the number of jobs do not reflect the actual number of people who will be employed annually. More people than the number of jobs will be employed because of such factors as turnover, absenteeism, vacations and holidays. However, the total payroll figure should be relatively constant. The payroll figures will change to reflect union wage agreements over the life of the mine.

PUBLIC HEARINGS
AND RESPONSES

PUBLIC HEARINGS AND RESPONSES

This section contains responses to transcript comments of the public hearing announced on October 5, 1973. The hearing was held at Crow Agency, Montana, on November 6, 1973, and continued to November 13.

The speakers, their main comments pertaining to the draft statement, and responses, if any, are listed in sequence. Favorable or neutral comments were generally summarized and in some cases quoted directly from the transcript and a no-response indicated.

Comments that were unfavorable to the draft statement were either treated individually or summarized and followed by a response. In some cases several related unfavorable comments were summarized and one response prepared. In all cases, the major thrust of unfavorable comments were treated with a response.

RESPONSE TO NOVEMBER 6, 1973, PUBLIC HEARING

Joe Kuzara - Resource Information Association, Roundup, Montana.

Comment: Although some of the elements of the statement could have been examined in more depth, the additional time and money required probably could not justify it. It appears that the mining project represents the best method of achieving a broader economic opportunity for the Crow Nation and economically distressed surrounding area.

Response: None

Dale Fredlund - Resource Archeology from the Montana College of Mineral Science and Technology in Butte, Montana.

Comment: "On the basis of our study, I think that the data that is presented in the Bureau of Indian Affairs' Environmental Statement concerning archeology and history is for the most part quite accurate."

Response: None

Francis J. Walcott -Sierra Club, its Northern Plains Regional Conservation Committee, and its Northern Rockies Chapter.

Comment: "The increased employment opportunity especially for Indians, is shortlasting."

Response: The project life of this mine is expected to be 20 years. At the end of this period, the workers would be able to apply their skill in other mines or in other jobs.

Comment: "Reclamation and revegetation to a usable condition is not yet really assured; and until in practice it can be shown to be effective over a long period of time. There can be no assurance that ranches will not be seriously and permanently displaced."

Response: pp 140 DES. Whenever analysis indicate material unsuitable for revegetation, a proper depth of usable subsoil will be added, which with the topsoil, will be of sufficient depth to ensure growth.

Comment: "Wildlife is one of the major resources of the region, and any potential loss must be considered in evaluating the desirability of any course of action."

Response: pp 112 of DES admits that wildlife will be affected by the mining activities; on pp 144 Westmoreland agrees to monitor the effects of their mining on wildlife species and their habitat.

Comment: "The possible or even probable future development projects beyond the one now under consideration need review now so as to permit evaluation of their plan in relationship to all others proposed or potential."

Response: This DES considers only the 1,280 acres in this mining plan. Any further development will require environmental review. However, programatic statements are now being prepared for the Crow and Northern Cheyenne Reservations. Also, the Northern Great Plains Resource Program Study is underway which encompasses coal development impacts in the six Great Plains States. These studies will give a broader overall view of coal development impact on a regional basis.

Comment: "The effect of noise on wildlife and livestock needs more consideration than the simple assumption that no harm will be done."

Response: As stated on pp 104, the statement that the noise will not affect wildlife is controversial.

Comment: "It must be pointed out that the statement signficantly underestimates the value of the existing ranching operation, both to the local economy and to the national welfare."

Response: Wheat, hay, and cattle prices have gone up considerably during the last year, but the prices used are based on a historic trend. Hay and cattle production figures were recalculated upward. See changes on page 49 and 50 of the final statement.

Comment: "Land restoration merely being the repiling of topsoil, as suggested, is not sufficient or necessarily effective."

Response: pp 140 DES. Wherever analyses indicate material unsuitable for revegetation, a proper depth of usable subsoil will be added, which with the topsoil will be of sufficient depth to ensure growth.

Comment: "The potential for timber activity could have a very short-term beneficial effect economically. But with the extreme limits on suitable timber and productivity in the area, this would be undesirable to promote for the long term."

Response: pp 109 DES. Removal of part of the forest cover through harvest of ponderosa stands of this type will permit minor increases in forest production as well as stimulating growth of residual timber as a result of release from competition. Regeneration in this timber type is normally based on natural regeneration with the residual stand providing the source of seed.

Comment: Research should be done prior to the disturbance; and if it indicates that reclamation will not be successful, the development must be forgone."

Response: Reclamation measures relating to soil and vegetation on pp 140 DES will be adhered to. Also Federal and State mining and reclamation laws as stated in pp 150 and 151 must be followed. As indicated in DES pp 150, cancellation and forfeiture of the lease for violation of the terms and conditions of the lease is provided for. Finally as indicated on pp 148 a hydrologic monitoring system and the operation thereof to study ground water levels and quality changes will be initiated shortly by the Montana Bureau of Mines and Geology.

Comment: "Esthetic quality is a significant feature too. Should the ranchers be treated with any less respect for their rights and privileges than the rest of the public?"

Response: There are relatively few ranchers that would be affected.

Comment: "The major physical effect likely for any of the resources as a result of the proposed operation (aquifers) is inadequately understood and researched."

Response: It is acknowledged that surface aquifers will be destroyed in a mining operation and the surrounding extent of disruption is unknown. Deep aquifers are not affected.

Comment: "A regional study is essential."

Response: A regional study - The Northern Great Plains Resource Program is currently in progress to evaluate the impact of coal development on six great plains states.

Bruce M. Cady - Rancher from Hysham.

Comment: There is no assurance that land can be reclaimed.

Response: pp 140 DES. Wherever analyses indicate material unsuitable for revegetation, a proper depth of usable subsoil will be added, which with the topsoil will be of sufficient depth to ensure growth.

Kit Muller - Vice Chairman of the Northern Plains Resources Council from Billings, Montana.

Responses to the coverage of the agricultural, economic and social situations presented at the hearing are not included here, but responses are included in the next section for the more detailed written comments submitted by the Northern Plains Resources Council.

John Redding - Rancher from Hysham.

Comment: A surface owner is requested to give up the surface and mineral state to get at the coal.

Response: No minerals of economic value except coal are known to exist in the ceded area.

Comment: "The entire Impact Statement talks only of poor soils, dry, hot weather, poor grazing lands, farmland that is nearly impossible to raise crops on. Off the SCS maps I've picked out, theres been 2,500 acres in the Sarpy Basin being farmed now either in hay or grain. Many acres have been farmed at one time that are turned back to grass, and there's much more that could be farmed."

Response: The DES gives a fair and accurate appraisal of agricultural conditions in the mining area based on SCS data and average county yields. The soil descriptions have been revised in the final draft to more accurately describe the soil conditions. It is indicated that there is considerable cultivated acreage in the Sarpy Basin. This cultivated land is as good as most of the other cultivated acreage in Montana and the limitations shown in the capability class explanation on page 52 were established to compare soils capability nationwide. Nearly all Montana land is therefore limited in its productivity when compared to these nationwide standards.

Comment: What is going to happen to the surface water in the springs? USGS indicated in March 1973 that all wells and springs that exist in the mined area will be destroyed.

Response: The DES admits that surface aquifers will be destroyed in the mined area and the extent of disruption in the surrounding area is not known. Deep aquifers will not be affected.

Edward M. Dobson - Northern Great Plains Representative of Friends of the Earth.

Comment: Color slides were shown to dispute the soils map on productivity. Former garden spots were mentioned among soils mapped as unsuitable for cultivation.

Response: The soil was mapped on low intensity detail which means that deeper or better soil areas less than 15-20 acres in size were lumped in with the dominant surrounding soil. However, the mapping unit as a whole is generally considered best suited for grazing. The 136D soil is not recommended for farming because of its slope (8-15%) and the shallowness of the Midway soil. This is not to say it could not be farmed. A good farmer using the best practices available could successfully farm these soils on a short term basis. In years of low rainfall the production would fall considerably, also the erosion hazard because of the steep slope make this unit risky for sustained farming. Also the mapping unit descriptions have been revised in the final draft. A garden spot could be located in almost any mapping unit. None of the soil was called unsuitable for grazing as Mr. Dobson states. The 736E is indicated as drouthy and produces little forage for grazing purposes.

Comment: "Stocking rate of 3.5 acres per animal unit month is too low."

Response: The two townships directly to the south as indicated in MRBI Report No. 186 show animal unit months grazing of 3.7 and 3.9. Also this area according to Big Horn County classification and appraisal office is classified in the 2.9 to 3.8 animal unit month group. This compares with 3.5 used in the statement.

Comment: Soil 24C is not listed in the Impact Statement or appendix.

Response: This is an error, the 24B mapping unit should have been 24C and has been corrected in the final statement.

Comment: A letter from the mayor of St. Paul, Minnesota rejecting the proposal for a pig's eye coal terminal.

Response: If indeed this terminal, the planned destination of ceded area coal, is rejected another destination will be selected.

George Luther - Rancher from Big Horn, Montana.

Comment: Grain production $29,000 is too low as stated on page 50 of DES - He believes that the mined land can be reclaimed if the companies are made to do it.

Response: Current grain prices are higher, but the figures used are estimated projections based on historic trends.

Jack D. Butorac - General Manager, Graham Staunton Chevrolet, Hardin, Montana.

Comment: Mr. Butorac attributes a substantial part of a $100,000 a year increase in gross sales to the Morrison Knudsen mine construction activity. He has had to add two new employees, one a member of the Crow Tribe as a result of this increased business. He encourages the orderly development of the Sarpy Creek coal mine area.

Response: None

Terry Murphy - Vice-President of Montana Farmers Union, Cartwheel, Montana.

Comment: Mr. Murphy asks who will replace water from a destroyed underground water supply and states that the land will never come back to its original production if its turned upside down.

Response: The Montana Strip Mining and Reclamation Act, under Section 22, indicates that the mining operator is responsible for contamination, dimunition or interruption of water supplies, proximately resulting from strip mining. It is acknowledged that portions of shallow underground aquifer systems will be destroyed within the limits of strip mining operations. However, additional ground water supplies are available which will permit the land to be brought back to production as stated in DES under the section on vegetation and soils, pp 106.

Ron Billstein - H K M Consultants, Billings, Montana.

Comment: H K M concurs with the basic information presented concerning water resources in the Draft Environmental Statement under the obvious constraint of data limitation and do not take issue with any engineering interpretation of the existing data.

Response: None

James Lee - Employee of Morrison Knudsen.

Comment: Mr. Lee presented his reasons for favoring mining and he was also representing Indian employees of MK. He turned over signed statements of employees to the recorder, all who favored mining.

The main reasons for favoring mining by Mr. Lee and all those who signed statements were: year round employment; adequate wage; work close to home; welfare reduction.

The following is a listing of those who signed statements: Don Dreamer, Patrick Alden, Russell White Bear, Floyd W. Case, George H. Farwell, Bruce and Agatha House, John Bullinsight, William House, Bruce White Bear, and Dewey Schenderline.

Response: None

Robert Yellowtail - Rancher from Lodge Grass, Montana.

Comment: Mr. Yellowtail questions the $17\frac{1}{2}$ cents a ton that Westmoreland offered as being too low. He thinks that the Crow Tribe should have at least $1.00 per ton.

He also presents an alternative to mining. If the U.S. government will pay the Crow Tribe for all the ceded area coal, then the area could remain as it is. But he wants the Crow Tribe to have the money for the coal.

Response: None

Madge John - Rancher from Hysham, Montana.

Comment: The BIA, Federal, State or County does not have any right to the minerals; gas, oil, or building stone on the potential coal stripping area. They belong to the landowners.

Response: In the majority of Tract III the non-coal minerals are owned by the surface owner. Page 118 of the Final Statement has been revised to clarify this issue.

Earl C. Gross - Hardin Chamber of Commerce.

Comment: There has already been established a history of economic growth and development attributable to the pre-development of the Westmoreland Mine. Hardin now has a housing development for approximately 80 families who are directly associated with mine development and in addition about another 30 family housing units are being added for those who provide goods and services. The taxable evaluation has increased by about $1,750,000 as a result of mining activity. The chamber feels that orderly mine development is essential for the immediate economic viability of the Hardin area as well as contributing to the energy needs of the nation.

Response: None

Joe Crosswhite - International Representative for the Operating Engineers Union, Columbia Falls, Montana.

Comment: Mr. Crosswhite is concerned only with the hourly wage, people who are represented by his union. He says Morrison-Knudsen is a local contractor that is going to hire local people. Morrison-Knudsen has an agreement with the union that Crow people will be hired first. He is against underground mining as being much more dangerous than strip mining.

Response: None

Reno Charette & Roberta Big Man - High school students from St. Labre.

Comment: Miss Charette stated that "we are not guaranteed that the land will be restored and Indians aren't guaranteed worthwhile jobs." Miss Big Man stated "after the mine is dead, we will have no land and no jobs."

Response: As stated by DES pp 106, reclamation methods will be used to insure revegetation or the mining will be halted. Also as stated on page 94, preferential treatment will be given Indians in job placement. After the life of the mine is over, the job skills learned will be able to be transferred to other mines or to other industries.

Sally Forbes - Sheridan, Wyoming

Comment: Well-reclaimed, unpolluted coal development is hard to find except in a few model areas.

Response: Present state and federal laws require reclamation of coal mines.

Comment: Unplanned, rapid transient-type population influx cannot help but affect communities by boom-town sociological impacts.

Response: It is acknowledged that there will be some cultural and social disruption especially among the Crow people, but if adequate planning is undertaken, this can be kept to a minimum.

Eloise Pease - Secretary of Crow Tribal Mineral Committee, Lodge Grass, Montana.

Comment: Mrs. Pease indicates that the median family income of Crow Indians today is $2,802 compared to around $5,000 for the U.S. and that Crow Tribal enrollment has increased from 4,149 to 5,325 (+28.3%) during the 1960-70 decade. Just in Tract III it is estimated that there will be 100 million dollars revenue within the next 20 years. This would amount to $60 per month increase per capita to members of the Crow Tribe. The 1,280 acres to be mined over the next 20 years is a small percent of the ceded area. Even if the mined area would be disturbed forever, it would be a small price to pay for the income derived from it.

Response: None

Elmer Yarlott & Janelle Timber - Students at St. Labre high school

Comment: Mr. Yarlott asks that the old generation leave the land as it is. Miss Timber indicates that the reservations are going to be one big mess with coal mining.

Response: None

Philip Beaumont - Rancher Crow Reservation

Comment: Mr. Beaumont states that the Crows have a right to methodically study the mining proposal as he is vitally interested in the economical status of the Crow people.

Response: None

Dave Stewart - Chairman, Crow Tribe

Comment: Mr. Stewart indicates that the revenue produced by the mine would be considerable, up to $11,000,000 a year, and that it would raise the economy of the Crow Tribal members. He also indicates that the stripped land could be satisfactorily reclaimed.

Response: None

Robert Howe - Chairman of the Crow Minerals Committee

Comment: Mr. Howe wants to make sure that the Crow Tribe's rights are protected concerning coal mining.

Response: None

RESPONSE TO NOVEMBER 13, 1973, PUBLIC HEARING

Dewitt Dillon

Comment: Mr. Dillon is an advocate for coal development but believes that the Indians should demand their share of the take.

Response: None

Donald Deernose

Comment: Mr. Deernose indicated that strip mine reclamation work that he had seen in Arizona, Colorado, and Missouri was very satisfactory. He indicates that a public information program should be carried to the Crow people explaining the potential coal mining operation.

Response: None

Dewey Schenderline

Comment : Mr. Schenderline is an employee of the coal industry and he said that coal development has given him and a lot of other Indians a local year round job. He also feels that reclamation can be successful.

Response: None

John Cummings

Comment: Mr. Cummings believes that the Crow Tribe could get a little more money by negotiating with the coal company, but he does not believe that the tribe should go to court. He does favor coal development.

Response: None

Donald Dreamer

Comment: Mr. Dreamer, a scraper operator for Morrison-Knudson, said this is the best job he ever had. As a former printer by trade he always had to commute quite a distance to work. His present job enables him to be at home every night. He is highly in favor of coal development.

Response: None

Robert Howe

Comment: Mr. Howe believes that the impact of coal development should be studied by the Crow people. He feels that the Crows should know just how they will economically benefit from the development.

Response: None

WRITTEN COMMENTS AND RESPONSES

STATEMENT OF DAVID STEWART, CROW TRIBAL CHAIRMAN

The following is a statement by Mr. David Stewart, the Crow Tribal Chairman speaking for the tribe.

And as the Chairman of the Crow Tribe in speaking on behalf of the Crow Indians as well as an individual here, I'd like to point out the things that we can realize from these developments if we should have it.

I'm not an economist. Yet from the various studies I find that a dollar can turn over five times. If the Crow Tribe were to realize the coal development at this time that they're very small in resources, according to the statement here it would generate an income of approximately $2,200,000.00, including revenues to the Crow Tribe as well as the labor involved in the development. And the Indians would turn over that over five times approximately and find that it comes to approximately $11-million dollars a year. That would certainly raise the economy in Big Horn County, Yellowstone County -- the southern part of the country.

I'm sure a lot of people around us are concerned with this. And not only that, I find I'm in a position to say that if we were to get involved in this coal development, the Crow Tribe would be in the area of development of the human resources. This means creating jobs for individual people as well as different families.

And of course, there would -- revenue created by the development would also create other natural resources within the boundaries of the Crow Indian Reservation which, in turn, would raise the economy of the Crow Tribal members.

And I say here that in such a case as this, I find this would alleviate the problem of the State of Montana supporting the Crow Indians through the welfare that we realize today.

No response required.

We have many people right today -- even this morning, before I came to the office -- in fact, that was the reason I was delayed at 10 o'clock this morning because there were people waiting that were in need, looking for some support to meet their needs. Right now there is a lot of people that are waiting to be helped to buy fuel for their stove, for their heating facilities. Winter is coming with us. Just right around the corner. In fact, some people have lost their propane/butane tanks because they couldn't afford to keep them up.

This is the kind of a problem we have in the Crow Reservation today. And as I've stated here, as a result of these problems I was delayed coming to the meeting this morning because of the situations.

This is something that goes on every day, practically 24 hours a day. And to me, the coal development would alleviate almost of of this problem with my fellow tribal members.

I can say that I am a very fortunate person today for this development -- that is to say, that I have had the privilege of working for the Bureau of Reclamation as a Soils Laboratory Technician -- as a Soils Analyst. And then again, several years thereafter I worked for the BIA as a Soils Conservationist before I became the Crow Tribal Chairman.

In these fields of trade I find that it creates a great opportunity for realizing that the potential development that you can realize from the natural resources we have around us. And in the area of the soils analysis field, I was privileged to analyze the soils of different types while the Bureau of Reclamation was considering the Yellowtail Dam back in the year 1958 to 1962.

Prior to that I was working for the Bureau of Reclamation as a Soils Laboratory Technician. In this method, I find today that this same mechanism is applicable to these same developments in the field of coal. I find that we can replenish the land that was disturb by utilizing the State Laboratories Soils Analysis to determine the needs of a soil that would regenerate to grow grass, to farm, or what have you, in the field of agriculture. I am very confident that the soil -- the ground that we disturb can be reclaimed in some areas.

Sure, there's bound to be some problems. But at this time I do not foresee any real appreciable amount of problem because of the fact that I am very confident in these soils analysis and these tests that are conducted that we can reclaim this land.

No response required

Once again, I am very fortunate that today I have had the privilege of making a physical survey of all the coal developments lying west of the Mississippi. Even chemical plants all the way from the Gulf of Mexico clear to this area. And I find that from these experiences I can say that the potential coal development we have today can be developed with no appreciable amount of problems because I rely on the soils analysis that are being conducted at this time.

This means in the field of reclamation -- we can utilize these people that are concerned with this area. I sympathize with these people because I, too, am a person who utilize his own land. Not much, but at this time I have a small operation itself. I am utilizing my own land. So I do see the need and the value of land itself.

And once again, I appreciate your presence here in taking your time, coming in this afternoon and this morning, to take part in this statement. And I'd like to thank you for it.

United States Department of the Interior
GEOLOGICAL SURVEY
WASHINGTON, D.C. 20244

OFFICE OF THE DIRECTOR

DES 73-59

NOV 12 1973

Memorandum

To: Commissioner, Bureau of Indian Affairs

Through: Deputy Assistant Secretary--Energy and Minerals NOV 15 1973

From: Director, Geological Survey

Subject: Review of draft environmental statement--Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal

We have reviewed the draft statement as requested in Mr. Stephens' memorandum of October 3, 1973, and are pleased to note that all substantive matters in our comments on preliminary and working drafts have been addressed and have generally been resolved to our satisfaction. We extend our compliments to your task force for preparing a statement of such quality in so short a period of time.

We do note that the statement is not consistent in its observation of accepted form with reference to geologic names and terms used both as proper and common nouns. Most notable is usage of the term "formation."

Attached is a list of specific comments intended to clarify or improve the accuracy of the present text. We hope that these will be helpful in preparation of the final environmental statement.

W A Radlinski
Acting Director

Attachment

November 9, 1973

Specific Comments
U. S. Geological Survey
DES 73-59

1.	Page iv and page 189, title of Chapter VII: The language should be brought into agreement.	1. Page iv and Page 189 have been brought into agreement.
2.	Page 5, first two paragraphs: If the Crow Tribal ownership of coal rights totals only 150,000 acres out of a surface area of 1.1 million acres in the Ceded Area, we suggest information be added concerning the remaining coal rights. Reference No. 1 is not referred to in the text.	2. Ownership of coal rights other than tribal is by the State of Montana and various other owners in fee status.
3.	Page 13, line 8, and page 71, line 9: We are unaware of the meaning of the term "stray."	3. Changes made in text.
4.	Page 16, line 20: We believe applicable State and Federal regulations should be cited.	4. Refer to page 128 of final statement.
5.	Page 22, paragraph 4, "Environmental Assessments or Impact Statements" would be prepared": Should additional coal sales require significant changes of the mining plan, an environmental assessment would be made as required by Department of the Interior practice and, if required, an environmental statement would be prepared.	5. Changes made in text.
6.	Page 42: Figure 2 is out of place; it should follow page 34.	6. Change made as suggested.
7.	Pages 51-54: On these pages, which deal with soils, the number of mapping units does not agree completely with the map on page 52. The text says eight units and enumerates nine. Unit 45C was not found on the map, and eight of the 16 units on the map are not in the tabulation. This should be resolved.	7. Changes made in text.
8.	Page 71, and Appendix E, page 232: The Tongue River Member is indicated as being 650 feet thick (total). This should be changed to 1,650 feet.	8. Changes made in text.
9.	Page 71: We suggest that the geologic cross section be expanded to include all coal seams present below presently economically strippable depths, such as the "big dirty seam." This would aid in understanding the total coal resources of the Ceded Area.	9 - The cross section presented shows all present recoverable reserves by open pit mining.

10. Page 72: The Hebgen earthquake is mentioned as ". . . affected an area of 600,000 square miles." No mention of what the effects were is made. The last three sentences of this paragraph are misleading and should either be clarified or deleted.	10. Changes made in text.
11. Page 73, first paragraph, line 8: The word "vein" is used incorrectly; it should be "bed" or seam."	11. Changes made in text
12. Page 73, last paragraph: We suggest that the first sentence be changed to read ". . . ore have been found . . ." We don't believe the basis exists for the present text.	12. Change made in text.
13. Page 77: Figure 6 is based on very tenuous assumptions. The title should be changed to "approximate flood magnitudes . . ."	13. Change made in text.
14. Page 85, first paragraph, lines 3 and 4: Neither the aquifer nor the coal bed is there because of the structural high. Water is in the aquifer and available for use because of the high--recharge to the aquifer is the important thing.	14. Change made in text.
15. Page 88: The transmissivity and storage values from the southern Powder River and Decker areas may not be applicable to this area, but they do represent the only data available. Similarly, data in table 10 are applied without regard to geography. We believe that stronger qualification of these data should be made in the text.	15. Change made in text.
16. Page 90, under "Water Rights": A statement is made that "surface water rights prior to that date (January 1, 1962) take precedence over all prior or subsequent ground water rights." We are uncertain of the accuracy of the statement and suggest that it be reexamined.	16. Refer to page 3, paragraph 4 of "Montana Water Laws: A Resume."
17. Page 101, lines 7-9: We suggest that the sentence, "Vehicle emissions for small towns such as Hardin will be greater," must be explained. The sentence does not relate to methane discussions, and no basis has been established for the statement.	17. Changes made in text.
18. Page 103, line 2: The meaning of the phrase "as they were from the mining operation" is unclear. In fact, no basis exists for such a comparison--it is sheer speculation.	18. Change made in text.

19. Page 104, paragraph 5, line 4: "They" is without reference; we suggest changing to read, "Westmoreland Resources."	19. Change made in text.
20. Page 128, line 4: We suggest that appropriate Federal and State standards be cited.	20. Standards cited.
21. Page 133, lines 1-4: Personal income is not a mitigating measure of and by itself. It would appear to be a beneficial impact; as such, it may figure in the balancing process of decisionmaking.	21. Change made in text.
22. Page 135, line 11: Change "enforcement by the Office of Mine Safety, U. S. Bureau of Mines" to "enforcement by the Mining Enforcement and Safety Administration."	22. Change made in text.
23. Page 136, line 20: We believe notification to the local office of the Bureau of Indian Affairs and the U. S. Geological Survey should also be made.	23. Necessary agencies included.
24. Page 137, line 7: What other arrangements are possible to stabilize the stock piles? Does this include chemical stabiliziation or water curtains--we believe the appropriate methods should be listed.	24. Change made in text.
24. Page 139, lines 1-3: Change "Bureau of Mines" to "Mining Enforcement and Safety Administration." The Federal noise regulations established pursuant to Sections 6(a) and 8(g) of P. L. 91-596, the Occupational Safety and Health Act of 1970, and specifically the noise exposure regulations set forth in 29 CFR 1910.95 should also be addressed here.	
25. Page 140, line 11: The references to high sodium throughout the statement are disturbing as we find no analyses to confirm this. We believe this matter should be clarified and appropriate data be appended.	25. Added Appendix J.
26. Page 140, lines 12-15: We believe the number of soil tests planned per unit area and testing procedures to be used should be identified.	26. Seventeen drill holes were made to determine overburden characteristics. Detailed chemical analyses were made on five of the drill holes. Soil testing is continuing.
26.a Page 142, lines 5 and 6: Has the possibility of chopping all lumber mill waste products for use as mulch been considered rather than burning of this material?	26.a Westmoreland is presently contemplating using all waste material as mulch.
27. Page 144, lines 11 and 12: This plan must also be approved by the U. S. Geological Survey Mining Supervisor, and the text should be amended accordingly.	27. Change made in text.

28. Page 159, last paragraph: The statement should make clear that land surface will not be at the same elevation before and after mining. After mining, the land surface will be 18-20 feet lower for 170 feet of overburden and 6-8 feet lower for 230 feet of overburden. This will influence drainage, etc. An average of 52 feet of coal will be removed to the base of the Robinson coal bed. After compaction, the spoil will have expanded about 20 percent with reference to the consolidated overburden. This means a general lowering of the land surface in the mined area.	28. Has been clarified in text.
29. Page 160, line 3: "Vegetation" should read "revegetation."	29. Changed in text.
30. Page 161, fourth paragraph: What will happen to the sediment detention dam at the end of mining and reclamation? We suggest that the statement include this aspect of reclamation, as it has the railroad and other matters.	30. Changed in text.
31. Page 169, last paragraph: Subsidence with the thin overburden will result. The only way it could be prevented would be to move the underground mine to an area with much thicker overburden. We believe the text does not adequately appraise the alternative of subsurface mining; most especially the conditions which preclude its use.	31. Insufficient overburden thickness is present on Tract III (see Appendix E) for removal of coal seams by underground methods, without the danger of surface subsidence. The Montana strip mining and reclamation act does not provide for reclamation of surface subsidence caused by underground mining. Major disturbance to the land surface would result if this mining method is utilized.
32. Pages 171-178: The discussion of alternative uses of coal in our view is more a description of processes, rather than how or why these are viable or nonviable alternatives.	32. The viability of mine-mouth power generation; coal gasification; and coal liquefaction is mainly dependent on bulk coal transportation costs and the market economics of the manufactured energy products involved. It is evident that mine-mouth power generation and coal gasification are already competitive in the economic marketplace. Coal liquefaction may soon achieve the same status due to the middle east oil embargo.
33. Page 185, paragraph 3: It is not clear how sulfur dioxide removal at existing plants is an alternative. A lead sentence more clearly stating that continued usage of high-sulfur coal can be considered as a viable alternative should be inserted. Then all aspects of feasibility should be examined and evaluated.	33. See change in text.
34. Page 246: Tables should show the source of the data.	34. Text changed.
35. Page 246, Appendix I: The quantities of fluorine listed should be rechecked. The amounts indicated almost bring fluoride out of the trace element category. Water should also be analyzed for fluoride.	35. Assays were re-evaluated. Further assays will be done when uncontaminated samples can be obtained. See change in Appendix I.

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:
L7427 MWR CE

NOV 6 1973

Memorandum

To: Director, Planning Support Group, Bureau of Indian Affairs
Montana

From: Regional Director, Midwest Region

Subject: Review of draft environmental statement

This is in response to your request for comments on the environmental impact statement identified as:

(DES 73-59) - for Strip Mining of Crow Indian Coal, Southeastern Montana

The staff of the Midwest Region, National Park Service, has reviewed this statement and expresses the observations checked below.

1. __X__ No established or studied units of the National Park System appear to be adversely affected by the proposal.

2. __X__ The proposal does not appear to adversely affect any site registered as a National Historic, Natural or Environmental Education Landmark, or any site listed as eligible for such registration.

3. _____ The statement should reflect consultation with the National Register of Historic Places, and discuss whether any National Register properties will be affected. If the project has an effect on a National Register listing, the statement should reflect further compliance with Section 106 of the National Historic Preservation Act of 1966 (P.L. 89-665).

4. _____ The statement does not clearly confirm consultation with the State Historic Preservation Officer for the state involved. The final environmental statement should reflect that he was consulted to determine whether the proposal will affect any cultural site which may be in the process of nomination to the National Register of Historic Places and contain a copy of his response.

5.________Where federally owned or controlled lands would be affected by the proposed action, the environmental statement should reflect the consideration given objects of historical, architectural and archeological significance under Section 2 (b) of the Executive Order 11593 of May 15, 1971, Protection and Enhancement of the Cultural Environment.

6.________The statement should discuss the action taken or proposed to professionally determine the presence or absence of archeological resources in the project area and the effect of the proposal upon any such resources present. The statement should further reflect procedures to be followed should previously unknown archeological resources be encountered during project development.

___X___Specific comments follow.

J. Leonard Volz

J. Leonard Volz
Regional Director, Midwest Region

Specific Comments:

The statement indicates that numerous archeological (pages 44-45) and historical (page 99) resources are known to exist in the vicinity of the proposed action. The statement also indicates on pages 44 and 45 that archeological surveys have been conducted "in the area in 1971 and 1972," resulting in the discovery of 8 sites and the extensive excavation of one of these. However, the thoroughness of the coverage of these surveys with respect to the lease lands specifically under consideration in this statement is not clear; the final environmental statement should provide an assessment of such survey coverage. If it is determined that all areas under consideration in this statement have not been adequately surveyed, the final statement should indicate arrangements that have been made to complete such a survey.

Furthermore, page 44 states that known archeological sites "do not appear archeologically significant enough to warrant excavation for recreational development." The meaning of this sentence, as well as other references within the statement regarding the significance of these sites, is unclear. The final environmental statement should 1) adequately assess the potential for these sites to contribute scientific knowledge about man's history and prehistory and 2) clearly indicate those sites that will be unavoidably adversely affected by the proposed mining activities. We suggest that the Director of the Montana Statewide Archeological Survey (Dr. Floyd W. Sharrock, Department of Anthropology, University of Montana, Missoula, Montana 59801) be consulted for an assessment 1) of the adequacy of previous survey efforts, 2) the significance of the known archeological sites, and 3) recommendations for any necessary mitigation. Likewise, possible adverse impact to historical resources should be evaluated. A sentence on page 100 seems to indicate that additional survey for the purpose of inventorying historical sites will be necessary. Additionally, if unavoidable adverse impact to any cultural resource is defined, the final environmental statement should provide an indication of arrangements that have been made to either 1) preserve the threatened resource or 2) mitigate the impact through professional archeological salvage excavation.

1. We are pleased to note that the possibility of the discovery and destruction of additional archeological resources during mining operations has been considered in the draft statement (pages 46, 100, 136, 157 and 195). We concur in the desirability of suspending operations in the event of such a discovery. However, we strongly suggest that the appropriate sentence on page 136 of the draft statement be changed in the final document to indicate that immediate notification will be provided to the Director of the Montana Statewide Archeological Survey.

2. The final environmental statement should also provide evidence of consultation with the State Historic Preservation Officer (Mr. Ashley C. Roberts, Recreation and Parks Division, Department of Fish and Game, State of Montana, Mitchell Building, Helena, Montana 59601) to determine if any cultural values presently on or eligible for the National Register of Historic Places occur in the vicinity of the proposed action.

3. All sources for historical and archeological data should be thoroughly referenced in the final environmental statement.

In summary, this statement 1) fails to evaluate the thoroughness and adequacy of previous archeological survey activity in the area under consideration and 2) does not indicate arrangements that have been made to provide for completion of the survey or mitigation of defined adverse effect.

Page 44 has been revised. Coverage of the previous survey has been discussed with the National Park Service. They stated that the survey was done under the direction of Dr. Sharrock and is believed adequate. Personnel at the mine site will be instructed to watch for archeological sites and will alert the State Archiologist in the event of a discovery.

1. Page 136 has been changed to reflect comment.

2. The preliminary working draft and the formal DES were reviewed by the appropriate state officials including those in the Department of Fish and Game.

3. See comments of Dale Fredlund. Page 75

United States Department of the Interior
BUREAU OF MINES
WASHINGTON, D.C. 20240
OFFICE OF THE DIRECTOR

November 6, 1973

Memorandum

To: Director, Planning Support Group, Bureau of Indian Affairs, 316 North 26th Street, Billings, Montana 59101

Through: Deputy Assistant Secretary - Energy and Minerals

NOV 12 1973

From: Director, Bureau of Mines

Subject: Review of Draft Environmental Impact Statement for the proposed Crow Ceded Area Coal Lease, Westmoreland Resources, Mining Proposal (DES 73-59)

The subject draft environmental statement has been reviewed by the Bureau of Mines in accordance with your letter of October 3, 1973. In general, the statement was found to be a concise and realistic appraisal of the potential environmental effects of the Westmoreland Resources coal surface mine under development in Tract III of the Crow Indian Ceded Area, Big Horn County, Montana. On the basis of the statement, we found no grounds for objection to the mine development. There are, however, several aspects that should be clarified in the final statement.

1. The draft statement does not clearly state the nature and manner in which ultimate reclamation of the mined land will be achieved. In particular, whether water from the mine pit will be used to irrigate seeded areas is left in question.

Comment 1 - Westmoreland Resources is not presently proposing the use of mine drainage water for supplemental watering or sprinkling of newly reclaimed areas. The suitability of mine drainage water for this purpose has not been established. However, the quality will probably be similar to, though more highly mineralized than that of existing shallow ground water supplies.

2. The capital investment in a surface mining operation of the size proposed cannot be reasonably offset in the five to six year period encompassed by present reserves to which Westmoreland holds the surface estate. It is essential, therefore, that the alternatives for fulfillment of the 20 year coal sales contracts alluded to in the second paragraph, page 9, be briefly described.

Comment 2 - Westmoreland Resources has submitted information to the Montana State Department of lands outlining the numerous alternatives available to the company for fulfillment of their contract requirements.

Westmoreland has purchased the surface on enough land to fulfill contracts for 20 years. They are still negotiating for more surface ownership to consolidate their holdings.

3. The description of the access and interior mine road systems on page 15 fails to mention how these roads will be constructed, surfaced, or maintained in order to withstand constant, heavy use and to minimize dust problems and accumulation of snow drifts during winter months.

Comment 3 - All access and interior mine road systems will have subgrades constructed of parent soil materials and will be surfaced with crushed clinker material. During the summer months a road watering program will be utilized for dust control as outlined in Chapters III, IV, and VIII of the EIS. The road systems will be cleared of snow accumulations during the winter months.

4. Additional description of the type and working capacity of the sewage treatment plant mentioned on page 16 is warranted, particularly from the standpoint of ultimate effluent disposal and capability to function under severe winter weather.

Comment 4 - Reference is made to the surface water paragraph of the physical environment section, Chapter IV, for a detailed description of the sewage treatment and effluent disposal facilities. Operation during the winter months will present no particular problem. Pumping and bubbling action prevents freezeup of the pond.

5. The discussion of accident risks on pages 99 and 135 incorrectly indicates that the Bureau of Mines has the responsibility for setting and enforcing safety standards. This function was recently removed from the Bureau of Mines and placed in the new departmental Mining Enforcement and Safety Administration office.

Comment 5 - Changed in text.

6. While the exact effect that mining will have upon the hydrologic environment of the mined area cannot be conclusively stated as suggested in the discussion starting on page 118, the disposition of water pumped from the mine pit should be described in detail. Some water will be used for haul road dust control. The remainder, however, could be beneficially used to irrigate seeded areas in order to enhance the vigor of initial vegetative growth. To avoid a salinity hazard, it would be necessary to over irrigate to induce downward leaching of soil salts.

Comment 6 - Consumptive use of mine drainage water is not presently proposed by Westmoreland Resources. Detention of mine drainage water will be practised to determine the character of the water and necessity for treatment, before downstream releases are made. The estimated quantity of mine drainage water is considered inadequate for use in the haul road dust control program. The source of water for this purpose will be the deep well supply which taps the Madison limestone aquifer. Supplemental watering or sprinkling of newly reclaimed areas, if required, will also utilize water from the Madison limestone aquifer, due to the low sodium hazard (see appendix F for chemical analysis).

A hydrologic monitoring system to study ground water levels and quality changes has been started by the Montana Bureau of Mines and Geology. It is not anticipated that water in the pits will be sufficient to do much irrigation of reseeded areas.

7. Although not specifically covered in the draft statement, mine run coal will undoubtedly be crushed before loading into unit trains. In consideration of the problems of dust associated with crushing and loading, the section on "Air Quality," begining on page 137, should be expanded to include a discussion of coal dust control measures, as well as stock pile fire control systems.

We appreciate the opportunity to have reviewed this draft statement and hope that our comments will assist in preparing the final environmental impact statement.

J. Morgan

Assistant Director

Comment 7 - The possibility of associated dust problems in crushing and loading operations has been considered by Westmoreland. The four possible sources of dust and applicable control measures are discussed in the following paragraphs:

1. Primary Crushing - The crusher is completely enclosed. No dust problem from the crusher or transfer belt to the secondary crusher is anticipated.

2. Secondary Crushing - The feeder, screens and secondary crusher are completely enclosed. The conveyor belt to the storage area will not create a dust problem.

3. Storage Area - The storage area is completely enclosed. Dust control will be provided by a slight positive air pressure during transfer of coal from the storage area to the loading bin over the railroad track.

4. Railroad Loading Bins - Loading bins and belts are enclosed. During the continuous train loading operations, a telescopic chute will be utilized to load each gondola car as it passes underneath. A small amount of dust may escape from this chute as the initial charge of coal is delivered to the front of each gondola car. Otherwise, the tip of the chute will remain buried below the loading coal surface as the remainder of the gondola car slowly moves past the chute. A sprinkler system may be installed under the loading bins, subject to investigation by the Mining Enforcement and Safety Administration.

The coal storage area fire control system is comprised of the following:

1. The coal storage transfer system has been designed to completely empty the coal storage bins. Free flow is possible from any point in the storage area to prevent coal from being retained in storage for extended time periods.

2. A rotary plow, located at the base of the coal storage bins, has also been provided to remove coal masses which may plug the exit chutes from the bins. If necessary, a sprinkler system may be installed in the tunnel under the coal storage bins.

In addition, an air pollution permit covering these facilities has been obtained from the Montana State Board of Health and Environmental Sciences.

United States Department of the Interior
MINING ENFORCEMENT AND SAFETY ADMINISTRATION
WASHINGTON, D.C. 20240

In Reply Refer To:
EMS - H&S

October 25, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

We have reviewed the Draft Environmental Statement for the Crow Ceded Area Coal Lease - Westmoreland Resources Mining Proposal enclosed with your letter of October 3, 1973. We thought it was very well written and quite comprehensive; however, we do have one comment with respect to the authority of the Mining Enforcement and Safety Administration regarding the operation of the proposed mine.

1. As you know, all coal mines must be operated in compliance with the Federal Coal Mine Health and Safety Act of 1969 and also its implementing regulations. We therefore suggest that the applicable implementing regulations be listed in the section on Federal Legislation (page 151) under item (3) Code of Federal Regulations. They are as follows:

30 CFR 71 - Underground and Surface Coal Mines, Surface Work Area Mandatory Health Standards

30 CFR 74 - Coal Mine Dust Personal Sampler Units

30 CFR 77 - Mandatory Safety Standards, Surface Coal Mines and Surface Work Areas of Underground Coal Mines

30 CFR 80 - Notification, Investigation, Reports and Records of Accidents

30 CFR 81 - Procedures for Identification of Representatives of Miners at Mines

30 CFR 82 - Notification of Legal Identity

1. These regulations have been referred to on page 151.

Ltr. to Mr. Wayne E. Stephens, Subj: Draft Environmental Statement for the Crow Ceded Area Coal Lease - Westmoreland Resources Mining Proposal

30 CFR 90 - Procedures for Transfer of Miners with Evidence of Pneumoconiosis

30 CFR 100 - Civil Penalties for Violations of the Federal Coal Mine Health and Safety Act of 1969

2. Also, in the interest of clarity and avoiding possible confusion at a later date, it might be advisable to change (1)(d) under Federal Legislation (page 150) to (d) Act of 1969 (83 Stat. 742; P.L. 91-173) - Federal Coal Mine Health and Safety Act of 1969.

2. Was changed as suggested.

We hope our comments are of some benefit, and we thank you for the opportunity to review such a high-quality Statement. If we can be of any further assistance, please do not hesitate to contact us.

Enclosed are your Draft Statements.

Sincerely,

John W Crawford SHH
John W. Crawford
Acting Assistant Administrator--
Coal Mine Health and Safety

Enclosures

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
(DES-73-59)

NOV 2 1973

Memorandum

To: Director, Planning Support Group, Bureau of Indian Affairs

From: Director, Bureau of Outdoor Recreation

Subject: Draft environmental impact statement, strip mining of Crow Indian coal in southeastern Montana

This responds to your request for review and comment on the subject draft environmental statement.

It appears that there is little outdoor recreation activity on the proposed mining site and, therefore, mining the area would have a quantitatively small impact upon existing recreation opportunities in the area.

1. Addressing the future the statement indicates on page 117 that, "If the demand for recreational sites increases in southeastern Montana, the existence of strip mines in the Ceded Area might tend to restrict recreational use and the impact could become significant." We suggest that this section of the statement could be improved by clarification and discussion of the time frame involved. Since according to the statement ultimately all of the mined land will be reclaimed presumably the long-range potential for recreational use of these lands will not be appreciably lessened. We feel that the statement might develop this point in detail.

1 - The mining operation will restrict the recreational potential very little in the near future and as the land is restored it could enhance the potential. There will probably be an increase in use for a short time as people interested in watching large machinery and mining operations drive to the area to observe. The surface area is privately owned and recreational use depends on present and future landowners and their attitude toward such use.

We appreciate the opportunity to review and comment on this statement.

Jeanne F. Anderson
for James G. Watt
Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

711 Central Avenue
Billings, Montana 59102

October 30, 1973

MEMORANDUM

To: Director, Planning Support Group, Bureau of Indian Affairs
316 North 26th Street, Billings, Montana 59101

From: Area Manager (ES/1100:142)

Subject: Draft Environmental Statement - Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal, Montana (DES-73/59)

We have reviewed the subject draft Environmental Statement which was forwarded to us from our Washington Office. Our comments follow.

The draft is well done and its treatment of potential impacts on fish and wildlife and the related environmental aspects appears generally adequate.

We have a few comments on specific language of the draft as follows.

1. Page 61 - Table 5, last paragraph. The count of three doe and two fawn white-tailed deer yielded a fawn/doe ratio of 67:100 indicating only fair reproduction. No valid conclusion could be drawn from such a small sample size.

1. Reference to white-tail condition has been deleted.

2. Page 66 - first paragraph. Paragraph fails to mention the probability of some waterfowl (mallard) and shorebird (curlew and killdeer) production at existing ponds.

2. Statement has been changed to reflect comment.

3. Page 112 - line 9. Should the loss of two square miles of habitat be called insignificant? We suggest the specific impacts be quantified insofar as possible.

3.- 1240 acres of habitat is the total to be used in 20 years; not more than 300 acres should be lost to wildlife use at any time.

Page 113 and 114. The analysis presented on these two pages is excellent.

4. Page 114 - last paragraph on railroad spur. We question the need for a 5½' high net wire fence on either side of the railroad.

4.- Page 114 suggests a fence between 4 feet and 5 1/2 feet high. The height will depend on location and number of underpasses and needs as determined by ranchers, wildlife specialists and company officials.

Page 147. We strongly endorse the proposed surface water monitoring program for the Sarpy Creek drainage to prevent pollution of the Yellowstone River.

5. Page 193 - first sentence (continues from page 192). Use of word "displaced" does not reflect the grim realities of individuals moving from disturbed area, going to bottom of peck order on adjacent habitat, their presence stressing all individuals, and eventual death of displaced individual.

5. Page 193 refers to displaced animals and perhaps does not reflect all the implication of displacement, but when it is accounted that only 400 to 500 acres will be disturbed at any given time under the present plan, the implications of displacement are reduced. The other factor to consider here again is the relatively small count of animals in the area.

Burton W. Rounds

Burton W. Rounds

United States Department of the Interior
BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY REFER TO: 150
120.1

OCT 26 1973

Mr. Wayne E. Stephens
Director
Planning Support Group
Bureau of Indian Affairs
Department of the Interior
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

In response to your letter of October 3, 1973, we have reviewed your draft of the Environmental Impact Statement for strip mining of Crow Indian coal in southeastern Montana, DES 73-59, and have the following comment to make.

No response required.

The mining proposal will not have any effect on programs of the Bureau of Reclamation. We appreciate the opportunity to review the statement and believe it adequately covers the environmental impacts.

Sincerely yours,

EF Sullivan
Assistant
Commissioner

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80203

30 NOV 1973

Mr. Wayne Stephens, Director
Planning Support Group
U.S. Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The Environmental Protection Agency has reviewed the draft environmental statement for the Crow Ceded Area Coal Lease and offers the comments below for your consideration.

1. The subject EIS necessarily addresses impacts on the market area, and concludes (page 131 and Appendix H) that there will be a discharge reduction, in the market area, of about 67,000 short tons per year of SO2. We are concerned about the impact of trace elements in the market area. In comparison with an earlier report by Bertine and Goldberg 1/ the concentrations of some of the trace elements contained in Sarpy Creek coal (Appendix I) are higher than estimated mean concentration for coals. In particular, the Cobalt concentrations are high (in Sarpy Creek coal) by a factor of about two. Cadmium concentrations appear high, the Vanadium value of 54 ppm is high as are certain of the Nickel concentrations. Thus, trace element loads in the stack and ash effluents in the market area could vary significantly from those presently encountered. Fluoride may occur in extremely high concentrations compared to concentrations found elsewhere. The resultant impact on vegetation could be significant. Further, the variability of certain concentrations from seam to seam and bed to bed make the data in Appendix I unrepresentative, if they were produced from a limited number of samples. It is concluded that the data are deficient for evaluations of the fate and impact of trace elements. Also, no data are provided to evaluate the present trace element composition of the hydrosphere and lithosphere at the site.

1/ Bertine, K.K. and E.D. Goldberg, 1971, "Fossil Fuel Combustion and the Major Sedimentary Cycle." Science V172, 16 Jul 71, pp 233-5

1. Trace element analyses in the coal has been done for Westmoreland by Commercial Testing and Engineering Company. The coal analyses of Tract III was done from core hole samples. It is probable that these samples were contaminated from other strata in the core hole. A composite of other samples of Sarpy Creek coal is shown in the revised Appendix I together with an analysis of the midwestern coal now being consumed at the plants. A comparison of these two tables shows - the air quality at the point of consumption will not likely be reduced due to trace elements in the western coal.

Westmoreland Resources will take samples from each seam at 1,500 feet intervals in each cut every third cut, (450 feet in interval). Composite samples will be taken from each seam. These samples will be submitted to a commercial laboratory for analyses of trace elements. Each sample will be taken from the pit. This program will continue until a pattern for the vertical and horizontal constituency of the coal is discernible.

If it becomes evident within the composite samples of the Rosebud-McKay and Robinson seams, there are relatively high concentrations of particular trace elements, the most particular elements will be analyzed so as to determine if they occur in a specific strata within each seam.

Westmoreland Resources will make the results of this program available to the U.S.G.S. and state of Montana.

Westmoreland Resources will also use care in mining the coal to avoid contaminating the coal with materials from above and below the coal seams.

Surface water trace element concentrations are being analyzed under the surface water monitoring program. Under existing conditions exceedance of U.S. Public Health Service, drinking water standards has been noted for concentrations of manganese and cadmium in several of the samples. Five month composite analysis data of trace elements in surface water from near the mining site are shown in Appendix I. Continued trace element analyses will be obtained during the ongoing monitoring program. Presently, ground water samples are being subjected to standard chemical analyses for potable water supplies. Trace element analyses of shallow ground water supplies are not presently contemplated by Westmoreland Resources. However, an analysis of the deep well source which will be utilized as a domestic and dust control water supoly will be made.

To date, Mr. Wayne A. Van Voast, Montana State Hydrologist, has located and taken water samples from 33 wells and 28 springs in Tract III. These were sampled in the summer of 1972 and most were analyzed for calcium, magnesium, potassium, iron, manganese, aluminum and silicate cations, and bicarbonate, carbonate, hydroxide, cloride, sulfate, nitrate, fluoride, and phosphate anions. Other recorded indicies were ph, field temperatures, calculated dissolved solids, evaporated solids at 105^{o} centigrade, specific conductances in micromhos per centimeter at 25^{o} centigrade, sodium absorption ratio carbonate hardness as $CACO_3$, noncarbonate hardness as $CACO_3$, total hardness as $CACO_3$, total alkalinity as $CACO_3$, langlier saturation index, arrive near stability index and technical corrosion index. These wells and springs were again sampled for analysis in the summer of 1973. A number of wells adjacent to Tract III were added to make a more comprehensive study. After the initial sampling and analyzing of water and with structural maps on the Rosebud-McKay and Robinson coal seams, hydrogeologic flow patterns were constructed for the area of the two coal beds and the Lebo-Tullock aquifer. These maps show a north-south trending ground water divide with discharge into Sarpy Creek to the west and into East Sarpy Creek to the north and northeast. In the fall of 1973, Mr. Van Voast drilled six batteries of surveillance wells along the east side of the proposed mining area. These batteries are mostly of three holes at each site with each hole being to an individual aquifer and packed off from the others. These aquifers were the overburden on the Rosebud-McKay seam, the Robinson seam and the Lebo-Tullock aquifer. In addition to Mr. Van Voast's program, Westmoreland resources has four points along Sarpy Creek west and north of Tract III, one point on East Sarpy Creek north of the tract, and one spring in the mined area which has been sampled each month for the past eight months. Two more points on East Sarpy Creek were added this past month to the sample sites. Water samples from these sites are given routine analysis, EPA standard analysis for all industries, and EPA standard analysis for the mining industry.

Trace element concentrations for samples of the overburden material within the mining site have also been compiled. The data is shown in Appendix I.

2. In regard to Appendix G, Dust Cloud Kinetics, the equations used were developed to make diffusion estimates from short stacks where aerodynamic downwash is a potential problem. Application of these equations to dust created from hauling on unpaved roads is questionable, and the factor of three used to compensate for non-point source is not substantiated. Nor is compensation made for averaging time so comparison can be made with National Ambient Air Quality Standards. The Workbook for Atmospheric Dispersion by Bruce Turner should be consulted for guidance on diffusion estimates.	2. The analysis of dust cloud kinetics in Appendix G of the EIS is presented as an academic exercise to show what conditions might exist if the road watering program were not implemented. This will not occur under the proposed monitoring system. Even if the watering system is not implemented the EPA requirements of an average of not over 60 $\mu g/m^3$ on an annual basis and 150 $\mu g/m^3$ for a 24 hour period will be met within less than one half mile. The results of three formulas are: Scorer and Barrett 1720 feet; Turner (point source) 2324 feet; and Turner (line source) 1220.
3. The treatment of reclamation, though some details are provided, is not clear as to compliance with Montana stripmined land reclamation regulations. It is well known that many attempts to restore disturbed lands have not considered natural views and horizons and instead, have substituted both regularity and irregularity in a manner not compatible with geomorphic shapes. The EIS apparently assumes that no supplemental irrigation will be necessary to prepare or sustain vegetation and therefore no provisions for irrigation were discussed. The EIS does not address long-term maintenance of the restored land nor does it specifically show that the operators will guarantee a stand of vegetation prior to abandonment. In view of the lack of an adequate demonstration of concurrent land reclamation in the Northern Great Plains, this lack of commitment could be cause for alarm. On the other hand, a well designed reclamation effort could serve as an example for future evaluations. The conclusion (page 195) that the "recontoured ground will have a regular undulating appearance" as opposed to the virgin "random hollows and rolling contours" is not indicative of the presence of plans to conform with the State of Montana's reclamation law. The law requires restoration to "approximate original contour of the land."	3. Reclamation of the mined land will be accomplished in accordance with the "Montana Strip Mining and Reclamation Act of 1973," as administered by the Montana Department of State Lands. At the present time, there is some question whether or not the so-called ceded area of the Crow Reservation is within the jurisdiction of the State of Montana and, therefore, there is a question as to whether the reclamation laws of the State of Montana would apply to the Crow ceded area. In the event it is determined that the ceded area is a part of the Crow Reservation and, therefore, the reclamation laws of the State of Montana do not apply, then the mining plan developed by Westmoreland Resources, if approved, will be required to contain reclamation requirements at least equal to and perhaps more stringent than those of the State of Montana. The text has been changed to reflect compliance to approximate original contours, even though the overall mined land will be lower with the different drainage features. Supplemental irrigation has been discussed. The Montana Department of State Lands has issued criteria for the definition of "approximate original contour" in its rules and regulations under the Montana Strip Mining and Reclamation Act. Long term irrigation should not be necessary if adapted varieties of plants are used and a good stand established. Revegetation of the mined area will be supervised and enforced by federal and state agencies.
4. On page 192, it is stated that timber resources will be restocked within 50 to 100 years. The EIS should provide documentation to support this claim based on experience with rehabilitated strip mines in the Northern Great Plains.	4. Text has been changed to omit reference to number of years needed. No documentation is available. Past experience has proven it takes 50 to 100 years to obtain a stand of timber under the best conditions.
5. The EIS indicates (page 9) that after 5 years of operation, another mining plan must be submitted. It does not however, indicate whether the second mining plan will be subject to public review and the environmental statement process.	5. After an environmental analyses the new mining plan will be subjected to public review as outlined by NEPA regulations in effect at that time.
6. The discussion of impact on shallow water resources is good. We thoroughly agree that the impact of mining on the hydrologic environment will be "quite pronounced" (page 118). The discussion indicates the lack of knowledge as to what may truly happen to the piezometric surface and to water quality as a result of mining and land rehabilitation. We find, however, a lack of plans to monitor the impact upon the environment (water and air).	6. A continuing water surveillance and testing program is being conducted by the Montana Bureau of Mines and Geology. Studies include the normal parameters associated with observation of surface and ground water supplies. These studies are fully explained in Exhibits 18, 19, and 20 of Westmoreland Resources mining application. Air monitoring will continue according to federal and state regulations.
7. The EIS points out salinity problems that could arise as a result of the high sodium content of the soil and the high SAR of some waters. We agree that increased soil and water salinity could be a most important detrimental impact of the operation. The draft EIS should explain what sampling or planning has gone into the mining and reclamation plan in regard to a pit-filling and rehabilitation system that minimizes the potential impact of high sodium concentrations.	7. A high sodium zone has been identified in the interburden between the two major coal seams. The data from these tests are presented in Appendix J. Overburden material containing high sodium concentrations will be buried in the spoil material to eliminate adverse impact on vegetative growth. Use of ground water from the Madison limestone aquifer for dust control and supplemental sprinkling (if necessary) of vegetation of reclaimed areas will minimize the sodium hazard.
8. The invertebrate aquatic biology of the Sarpy Creek watershed is not adequately addressed.	8. Monitoring of water is required. Degradati of the watershed and streams will not be permitted. This will provide adequate protection to the aquatic biology.
9. In view of the fact that the surface waters of the Sarpy Creek drainage have been over appropriated (page 80), it is not clear how Westmoreland can expect to successfully file for 75 gpm of water as is indicated on page 125.	9. Filing for an appropriation of 70 gallons per minute is not for the sediment detention dam but rather for appropriation from it. The purpose of such an appropriation would be to have available a local supply of water for contingencies that might arise. This application is subject to the provisions of the Montana Water Use Act, enacted in 1973.

10.	The statement on page 173 to the effect that pollutants from coal gasification plants can be more easily controlled is speculative since pollutants may find their way into the product gas stream where control is a challenge. To date no information as to the fate of trace elements in the coal gasification process has been provided.	10.	Extensive pollution control facilities will be a mandatory part of any coal gasification plant constructed in this country, in order to minimize plant economic losses, maximize product purity and for conformance to federal and state air and water pollution standards. The air pollutants will be subject to air quality standards in existance at the time of the possible construction of gasification plants as an alternative use of the coal resource.
11.	The EIS should quantitatively address the energy required to mine and ship the coal. Indications of considerations for energy conservation should be made apparent. The amount of energy required to mine a certain number of BTU's of coal (input value) should be compared with the extraction and delivery at points of use of other energy fuels.	11.	Total Btu's required for the production and transportation of 4,000,000 tons of coal annually will be 1,070,000 million Btu's per year. In comparison, the Btu value of 4,000,000 tons of coal will be 67,600,000 million Btu's. Energy conserving steps being planned are: (A) Railroad 1. The bed is designed for key efficiency. 2. The loading and unloading facilities are designed for 4,000 tons/hour. 3. Operating schedules are designed to have few stops and constant speeds. (B) Mine Operation 1. Motorized equipment will be stored indoors at night in winter to conserve fuel in starting equipment. 2. All heated buildings will be insulated. 3. Haul roads designed to conserve fuel. 4. Plans to use waste oil rather than diesel fuel for mixing with amonium nitrate explosive. 5. Coal haulage trucks will operate on diesel fuel and economic motivation will encourage efficiency. 6. Car pools to workers will be encouraged. 7. Dragline will use electricity and economics will encourage energy conservation in its use.
12.	As an alternative, the mining of coals from other sites within the Northern Great Plains but off the lease tract should be considered.	12.	Alternative mining sites are discussed on Pages 183 and 184 of the EIS.
13.	The discussion on oil and gas (page 73) would benefit if a representative cross-section of the deeper geologic strata and structure were provided.	13.	Appendix E contains a detailed tabulation of subsurface geologic formations. Oil and gas, if present, are generally found in the Pennsylvanian, tensleep sandstone.
14.	The EIS conveys the impression that the primary reason for the strip mining effort is to increase the direct and indirect income of the Crow Indians. Specifically, the 4x106 short tons per year operation is projected to provide $700,000 of royalty income, and $700,000 of direct payroll income to the Crow Tribe (page 95). On page 165, it is stated "In considering any alternatives it must be borne in mind that the primary purpose of leasing this particular coal is to provide income and employment opportunities to the Crow Tribe." The poll by the Community Action Program indicates that 94 percent of the people polled wished to pass a tribal moratorium on all coal development until "we know more about it." Further, the poll indicated that 86 percent of the tribal members polled did not know who coal contracts (for coal on the Reservation) were with, their worth, or their location. With the exception of a quote covering the ancestry of the Crow Indians (pp 36-37), the EIS gives no evidence that the proposed action is acceptable to the present inhabitants of the ceded area and the Reservation.	14.	The officers of the Crow Tribe as well as the appointed committees, have favored the sale and extraction of the Indian coal in the Ceded Area lying just north of their reservation. This then is the official Crow stand on development of coal in the area in question in E.I.S.
15	In view of the pressures being brought to mine coal from the Fort Union coals of the Northern Great Plains, the scenic and wilderness values of the Northern Great Plains, and the lack of demonstrated compatibility between western coal mining and the original land and aesthetic values of the area, the proposed mining effort could serve, much as the prototype oil shale tracts could serve, to demonstrate the technical and institutional feasibility of mining western coal and simultaneously restoring the beauty of western lands and views.	15.	Westmoreland has stated they hope to make this a prototype.
16.	In regard to the proposed Pig's Eye Coal Terminal in St. Paul, you should be aware that the Environmental Protection Agency has reviewed the EIS for the proposal and found the proposed action to be environmentally unsatisfactory. A copy of EPA's detailed comments on the Pig's Eye Terminal is enclosed for your information. Prior to completion of the final EIS for the Crow Ceded Area, it is recommended that you consult with the St. Paul District of the Corps of Engineers to determine the status of the proposed terminal.	16.	The coal sales contract does not specify delivery of coal to the Pig's Eye Terminal. If construction of the terminal is delayed or halted, coal will be delivered to the power plants by rail or barge facilities at other sites.

In accordance with current guidelines of the Environmental Protection Agency, the mining proposal for the Crow Ceded Area and the environmental statement will be categorized in the Federal Register as ER-2. A copy of the rating system is enclosed.

Please send us five copies of the final statement.

Sincerely yours,

John A. Green

John A. Green
Regional Administrator

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Washington, D.C. 20250

8420

NOV 19 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The draft environmental statement for the Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal, transmitted by your letter of October 3 to the Office of the Secretary, has been referred to the Forest Service for comment.

Our specific comments are attached. We appreciate the opportunity to review this environmental statement.

Sincerely,

Gene S. Bergoffen
PHILIP L. THORNTON
Deputy Chief

Enclosure

DEPARTMENT OF AGRICULTURE
Forest Service

RE: DRAFT ENVIRONMENTAL STATEMENT - CROW CEDED AREA COAL LEASE - WESTMORELAND RESOURCES MINING PROPOSAL

1. Although 14,745 acres within Tract III discussed in the draft statement have been leased, only 1,280 acres are analyzed in detail in the report. The smaller area represents the acreage to be mined to satisfy an existing contract of Westmoreland Resources to furnish 77 million tons of coal within a 20-year period. It is estimated that Tract III contains 625 million tons of recoverable coal. Adjacent tracts which are more than twice the size of Tract III have been leased to Westmoreland Resources and Amex, Incorporated. The mining company could easily expand their output from the Tract, and probably will as the demand for low sulphur coal increases to meet energy demands and air quality standards. Because of the above factors, it may prove to be somewhat academic to analyze the social, economic, and environmental impacts for the relatively small operation. Larger operations would have considerably different impacts.	1. Changes (except those of minor nature) will require new assessments and approval.
2. The importance of the area's shallow aquifers appears to be underestimated. The aquifers associated with coal seams in similar areas of eastern Montana provided the needed water through springs and shallow wells to maintain existing livestock industry.	2. See response to Dorothy V. Cady comments. Page 49
3. The report points out that the primary purpose of leasing these areas of coal was to provide income and employment to the Crow Tribe. It has been estimated the royalty income to the Crow Tribe will be $700,000 annually from the 77 million tons presently under contract. This amount of money equals the existing annual income of the Tribe. It is further estimated that approximately 63 jobs created by this contract will be filled by Crow tribal members for an annual payroll income of another $700,000.	3. No response required.
4. The statement points out the local rural culture of the area will change a slight to moderate extent as a result of mining the 77 million tons of coal. An assessment should be made concerning the effects of greatly expanded activity on the Tribe's material standard of living and culture.	4. No greatly expanded activity will result under the present plan. This is being considered in the programatic statement for the Crow Reservation which analyzes the impact from development of other tribal coal.

5. Since the statement is for the purpose of evaluating the environmental impact of the proposed mining plan, we suggest that the plan itself be included, insofar as feasible, in the environmental statement. Perhaps it would answer some questions which come to mind, such as:	5. Due to the volume and technicality of the mining plan, it is not included in the statement. However, it is available for review at the following offices: Area Office, BIA, Billings, Montana Agency Office, BIA, Crow Agency, Montana Geological Survey Office, Billings, Mont. State Department of Lands, Helena, Montana
a. What will be the approximate down-dip limits of mining on Tract III?	a. Drill Hole #288, in the proposed mining area, shows a depth of 225 feet to the bottom of the Robinson seam. This is the deepest core and is where the deepest mining is expected to occur.
b. Whether the final cut is likely to eventually fill with water, thereby creating a water source for wildlife and livestock? On page 73 it is stated that the coal vein has a high water content. As indicated by Map 3, mining will be in a down-dip direction. This being so, it seems probable that water will accumulate in the final cut (if there will be one as seems indicated on page 139 where there is discussion of a high wall). Such an impoundment could be viewed as a benefit to the environment.	b. Westmoreland Resources anticipate handling water through drainage methods rather than ponds, subject to regulation by the Montana Department of State Lands.
c. How will water courses be diverted to keep runoff out of the pit during mining? Drainage ditches should be designed to preclude erosion along their sides and bottoms. They should be placed at each end of the cuts and at the toe of the outslope in order to handle runoff in these areas until grading is completed and revegetation is successful. In the interim, the steep slopes of the spoils in these areas will be subject to severe erosion by rills, gullies, and mass movement. Control of stormwater runoff will be especially important until the above mentioned areas are stabilized.	c. Westmoreland will employ interceptor ditches.
d. Was the need for fertilizers in revegetation adequately appraised? The report states (page 141) that fertilizers will be used in the revegetation of the Burlington-Northern railroad right-of-way. The use of fertilizers for other lands affected is not mentioned.	d. Westmoreland will be conducting frequent soil analyses in order to measure specific needs for fertilizers. Westmoreland plans to add fertilizer as needed, but final determination is subject to the specific analyses referred to above and regulation by the Montana Department of State Lands.
e. Will there be provision for irrigation after seeding? Based upon the proposed mining direction, about one-half of the area should consist of south-west-facing slopes. Such slopes will be hot and dry during the summer. Some irrigation may be needed, at least during the first summer after seeding, to assist in revegetation.	e. Within the mining plan, there will be only one major southwest facing slope. Other slopes will trend generally to the north-east. Irrigation is not currently planned since it does not appear necessary for the native plants to be used for revegetation.
f. Will there be a monitoring program continued during and after the mining to determine the quality of water in Sarpy Creek below the mine and plant? Such monitoring should be prescribed to make certain that violations of Federal and State water quality laws do not occur.	f. Yes, there will be monitoring by the state.
g. Will the roads outside of the pit be surfaced? Since road dust will be a major problem, consideration should be given to road surfacing to maintain air and water quality and to promote highway safety.	g. The roads will be surfaced with clinkers and will be watered to control dust.
6. We are concerned about the effects of the dredging of 3.5 million cubic yards of material from the Mississippi River at the Pigs Eye Coal Terminal. The effects were not analyzed in the document.	6. Reference is made in the statement to the environmental statement prepared specifically for the "Pigs Eye" Project.
7. It would assist an understanding of the erosion potential if an estimate of rainfall intensities were included in the section on climate.	7. Text changed.

We note the need for the following corrections in the text:

Page 6, paragraph 2 - change to "Environmental Policy Act"

Page 34 - Figure 2, a wind rose is not placed where it belongs. It now occupies page 42.

OFFICE OF THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

NOV 19 1973

Mr. Wayne E. Stephens
Director
Planning Support Group
U.S. Department of the Interior
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The draft environmental impact statement for Crow Ceded Area Coal Lease Westmoreland Resources Mining Proposal which accompanied your letter of October 3, 1973, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

We have reviewed the subject draft environmental impact statement and recognize the adverse impacts resulting from the strip mine operation. The economic impact has far greater significance for the area in that new jobs and income opportunities for both Indians and non-Indians will be derived from the proposed project.

1. Although we agree with the authors of the draft environmental impact statement that the project would serve to upgrade the interests of the Reservation, the alternatives in Chapter VI should provide more quantitative inputs to show economic values for comparison as they relate to the principal activity. Such comparisons would include at least employment, income levels and collections in terms of ad valorem taxes and other resources.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

---

1. A cost-benefit analysis for each of the alternatives considered would become full scale studies in themselves. In light of the Crow Tribe's wishes, and sufficiency of information for decision making, the EIS information is adequate.

With regard to input requirements for other income alternatives for the tribe, minimum capital requirements would certainly exceed the tribal budget capacity.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION EIGHT
BUILDING 40, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

November 21, 1973

IN REPLY REFER TO:
08-00.21

Mr. Wayne E. Stephens, Director
Planning Support Group
United States Department of the Interior
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

We appreciate the opportunity to review the draft environmental statement for strip mining of Crow Indian coal in southeastern Montana. We are returning this statement for your further use and offer the following comments.

On Page 15 of the report the paragraph covers access roads but this does not directly involve any Federal-aid system or State routes.

1. Map No. 2 on Page 4 shows a continuation of FAS 384 as County Road No. 2. FAS 384 actually extends to the county line near Sarpy Creek. Also FAS 415, the North-South Secondary, has been extended by system action to the county line to make a connection with FAS 384. Therefore, the southerly portion of FAS 415 should not be shown as County Road No. 38. The report is correct, however, in that the access road to the mining site makes a junction with the county road since the two FAS routes do not traverse the area just North of the mining site.

1. Map changed to reflect comments.

The Burlington-Northern railroad spur is noted on Page 18 as having construction underway. Subsequent paragraphs on Page 20 and 31 use the words "will cross" and "will be constructed" across US Highway 10 and with an underpass at I 94 near Hysham. This construction has already been completed. The undercrossing of I 94 was coordinated with the Department of Highways, with FHWA concurrence, for the railroad work where it involved the Interstate.

Sincerely,

W. H. Baugh
Regional Federal Highway
Administrator

F.S. Allison
By: F. S. Allison, Director
Office of Environment & Design

Attachment

STATE OF MONTANA
DEPARTMENT OF INTERGOVERNMENTAL RELATIONS
MAIL TO CAPITOL STATION, HELENA, MT 59601
DIRECTOR S OFFICE 406/449-3494
AERONAUTICS DIVISION 406/449-2506
CENTRALIZED SERVICES DIVISION 406/449-3707
ECONOMIC OPPORTUNITY DIVISION 406/449-3420
HIGHWAY SAFETY DIVISION 406/449-3412
INDIAN AFFAIRS 406/449-2746
MUNICIPAL AUDIT DIVISION 406/449-3010
PLANNING/ECONOMIC DEVELOPMENT DIVISION 406/449-2400
THOMAS L. JUDGE
GOVERNOR

November 15, 1973

Mr. Wayne E. Stephens
Director of the Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The Montana State Clearinghouse of the Division of Planning/Economic Development have reviewed the draft environmental impact statement for the strip mining of Crow Indian coal in southeastern Montana. We wish to offer the enclosed comments from the State of Montana Department of Fish & Game and the Department of Agriculture.

Thank you for the opportunity to review and comment on the draft environmental statement.

Sincerely,

Bert Glueckert
Assistant Planner
Community Development Bureau
Planning/Economic Development
449-3757

BG/sm

STATE OF MONTANA

DEPARTMENT OF

FISH AND GAME

RECEIVED
1 1973

Milea City, MT. 59301
October 29, 1973

Mr. James Posewitz, Administrator
Environment & Information Division
Montana Fish & Game Dept.
Helena, MT. 59601

Re: BIA Draft Environmental Statement for Westmoreland Resources Mining Proposal

Dear Jim:

I have reviewed the BIA Draft Statement and the following general and specific comments have emanated from my review.

As a general comment, the Draft Statement, particularly the section on Alternatives to Proposed Action, reads like a justification for Westmoreland Resources' present activities and proposed actions. Also, economics seems to be the over-riding factor in all of the decisions that were made. These two facets of the Draft Statement are contrary to the stated purpose to be served by the preparation of a Draft Environmental Statement.

The following are specific comments related to the DS:

1. It seems that a more valid ratio than that used on page 11 would be the depth of overburden to be removed compared to the combined depths of the coal seams. This ratio figures out to be about 2.6 feet of overburden per foot of coal.
2. Does Westmoreland Resources have any plans to finance any of the community facilities which you state will become necessary (page 18)? Increased facilities may be needed immediately, but there may be a time lag in the increase of the tax base.
3. I doubt that "arrowhead hunters" and vandals are as destructive to archaelogical sites (page 44) as strip-mining will be.
4. Much of the data on page 47 refers to Colstrip. Shouldn't some data have been gathered around the proposed mine site? Wouldn't this be more meaningful?
5. The base values that you use for crops on page 50 seem to be a little low.
6. On pages 55-59, the qualitative description of vegetative communities appears to be reasonable, but there is an obvious lack of quantitative data.
7. On page 59, the assumption that overgrazing will continue and lead to vegetation deterioration is rather unfair. That statement seems to suggest that the land and vegetation will deteriorate without the ominous threat of strip-mining.
8. On-site evaluation of wildlife in the area seems to be rather limited. The comparison between antelope density in Garfield County, prime antelope habitat, and the density near the mine site is not very valid. There are more than just a few turkeys in the area around the proposed mine site. There should have been more on-site evaluation of game birds present.
9. Hunting is a recreational pursuit and public demand does exist for hunting on this area (page 68).
10. The statement is made (page 93) that this development will provide stable employment. Will this employment still be stable when the coal is gone in 20 or 30 years. No mention is made of what will happen then.
11. On pages 93-97, there is a tendency to play up economic benefits and play down detrimental social effects.
12. Will there be any effect on ranchers other than physical displacement (page 97)?
13. The statement about air quality on page 101 are confusing and misleading.
14. The statement on page 108 that the effects of dust may not be entirely detrimental and in some cases actually help a plant to survive is not supported by a literature citation.
15. It is stated (page 115) that highly selective herbicides will be used along the railroad-right-of-way and then on the next page, 2-4-D amine is included as one of these. Is 2-4-D amine classified as a selective herbicide?

1. Although there are several methods that may be utilized to determine overburden stripping ratios, all requiring qualification, the method utilized is intended to show the volumetric ratio of overburden to be moved for each ton of coal mined assuming the method outlined in the comment, the ratio of overburden thickness (± 150') to combined coal seam thickness (± 58') would be about 2.6 to 1.

2 - Westmoreland Resources does not plan any company facilities; they are assisting in road maintenance, fire control and other measures. The Chamber of Commerce at Hardin states that taxes and other benefits received will exceed costs of new services.

3. No response required.

4 - Colstrip has approximately the same elevation and climate. The environment is almost identical so the two areas should be reasonably comparable.

5. Crop values are projections for the next five years based on historical trends.

6. Quantitative studies have been initiated and will be continued.

7 - Areas of high use as: near water holes, salt grounds and handling areas could have erosion problems.

8 - A four season study utilizing, ground observation, aerial flights, aerial photographs and preliminary inspection of aerial color infrared was made; a four season base line study to continue the tests and studies is being conducted by Ecological Consulting Services of Helena, Montana.

9. Changed in text.

10 - Skills learned on this location would give workers labor mobility if necessary. Projections show a stabilization of labor of th type, in the area, for much longer than 20 or 30 years.

11. Adverse social effects can be minimized by tribal planning through self-determination

12 - Extent of other effects on nearby ranchers will not be fully known until results of water, air and other monitoring tests bein conducted are received and analysed.

13. Text changed.

14. Text changed

15 - 2-4-D is selective in as much as it only effects broad leaf plants. The purpose of this mixture is to obtain complete defoliation about 4 feet on each side of the railroad track as a fire control measure.

16. It is stated on page 117 that a large growth in population in southeastern Montana is not presently foreseen. This statement appears to be contrary to many population growth projections which have recently been made.

17. The revegetation plans presented in the Draft Statement (page 141) are quite vague and incomplete.

As a final general comment, the Draft Statement is replete with conclusions based upon the assumption that reclamation will be completely successful. This assumption conflicts with statements made in other portions of the D.S. which indicate that the potential success of reclamation is questionable.

Thank you for the opportunity to review this Draft Environment Statement.

Sincerely yours,

Robert R. Martinka

Robert R. Martinka
Project Leader
Coal and Energy Studies

RRM:fr

cc: Harley Yeager

[illegible]
[illegible]
TELEPHONE
CODE 406
449-3144

STATE OF MONTANA/RECEIVED
OCT 30 1973
INTERGOVERNMENTAL RELATIONS
PLANNING [illegible]

October 19, 1973

TO: Department of Intergovernmental Relations
Bert Glueckert, Assistant Planner

FROM: George Lackman, Commissioner
Department of Agriculture

SUBJECT: Environmental Statement - Crow Indian Coal in Southeastern Montana

Enclosed is the above mentioned environmental impact statement comments prepared by the Department of Agriculture.

Please return this environmental impact statement comments to the appropriate agency.

DEPARTMENT OF AGRICULTURE

EVALUATION OF INCOMING ENVIRONMENTAL IMPACT STATEMENTS

IMPACT STATEMENT RECEIVED FROM AGENCY United States Department of the Interior - Bureau of Indian Affairs	DATE RECEIVED: October 11, 1973
	DATE RETURNED: October 19, 1973

PROPOSED ACTION:

Crow Indian Coal in Southeastern Montana

EVALUATION BY THE DEPARTMENT OF AGRICULTURE:

Impact on Agricultural Environment: N/A

Short Term vs. Long Term Benefits/Detriments: N/A

Economic Impact: N/A

Social/Aesthetic Considerations: N/A

Alternatives: N/A

Additional Comments: N/A

Recommendations to Agency of Origin:

18. Most of the reclamation on slopes of over 10% should be done during the summer. By reseeding steep slopes during the low rainfall season, it will help prevent erosion and loss of seed.

DATE Oct 19, 1973

George Lackman
Commissioner of Agriculture

16 - The projections of high population growth included coal conversion plants in conjunction with mining.

17 - Revegetation plans and studies are lengthy and quite complete in the mining plan available at BIA, State and Westmoreland offices.

18. Recommendation will be seriously considered.

OFFICE OF CLERK AND RECORDER

BIG HORN COUNTY

JOYCE LIPPERT, Clerk and Recorder
RUBY WEMPLE, Deputy
SONDRA RICK, Deputy

HARDIN, MONTANA

COMMISSIONERS
JOHN BESEL, Chairman
DICK GREGORY, Member
ALEX NAYES, Member

November 16, 1973

Director,
Planning Support Group,
Bureau of Indian Affairs,
316 North 26th Street,
Billings, Montana - 59101.

Dear Sirs:-

I have been requested to submit a statement pertaining to the impact on law enforcement pertaining to the coal development in the Sarpy Basin in Big Horn County, Montana.

I have conferred with Mr. Robert Brown, Sheriff, Big Horn County, Montana, who has reported that as of this date, with the exception of increased traffic and traffic violations, there has been no significant increase in crime or criminal activity that can be related to the coal mining development in the Sarpy Basin. He noted that Westmoreland, who is developing the Sarpy Basin coal, has their own security force, and has been able to handle any minor vandalism or internal problems with their force.

Police Chief Robert Hamilton of Hardin, Montana, the County Seat of Big Horn County, Montana, noted that there was a population increase in Hardin due to the Westmoreland Coal Company operations and the construction of the railroad in the Sarpy area by Morrison-Knudsen. Chief Hamilton noted that the personnel with Westmoreland and Morrison-Knudsen were of the family type and that although most of these personnel were living in Hardin, they did not present any significant criminal problem. He noted that the sometimes riff-raff that follows construction did not follow these groups on this particular development. The only increase in criminal activity concerned minor traffic violations due to increased traffic and that the

No response required.

OFFICE OF COUNTY ATTORNEY

BIG HORN COUNTY

Douglas Y. Freeman
County Attorney
Big Horn County Courthouse
Hardin, Montana 59034

Phone 665-1412

(Director, Planning Support Group, BIA - Page 2)

city was now making a survey of traffic movement in order to better handle the traffic in the City of Hardin. Chief Hamilton further noted that there could not be any identifiable personnel of Westmoreland or Morrison-Knudsen with any serious crime in the City of Hardin, Montana.

In the handling of criminal complaints in my office, we did not note any significant or appreciable increase in criminal activity by reason of the coal development in the Sarpy Basin as of this date. Many of the people employed on the development, as part of the labor force, were people who were already living in this area.

Very truly yours,

DOUGLAS Y. FREEMAN

DYF/rlp

CC: Sheriff Robert Brown
Chief of Police, Robert Hamilton
Westmoreland Resources

OFFICE OF CLERK AND RECORDER
BIG HORN COUNTY

JOYCE LIPPERT, Clerk and Recorder

COMMISSIONERS
JOHN BESEL, Chairman
ALEX NAYES, Member
JOHN LIND, Member

HARDIN, MONTANA
November 15, 1973

Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The Board of County Commissioners would like to comment on the impact made by the coal development in the Sarpy Creek area as relates to the road system.

There has been a marked increase in traffic in that area during the construction period. The companies involved in the coal development have helped with the maintenance in the area especially from the end of the oil on FAS 384 to the entrance to the development.

No response required.

Another factor to consider in an area as large as Big Horn County is that equipment is available from the coal companies to more effectively fight range fires. This past summer their equipment was disbursed to the sight of a fire and was able to control many fires before it was necessary to send equipment from here.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
BIG HORN COUNTY, MONTANA

By:
John Besel, Chairman

JB:ljl

A Scientific and Policy Review
of the
Draft Environmental Impact Statement
Crow Ceded Area Coal Lease
Westmoreland Resources
Mining Proposal
of the
Bureau of Indian Affairs
Department of the Interior

Submitted to the Department by the
Environmental Impact Assessment Project
of The Institute of Ecology

Edited by

Rick Applegate
Malcolm F. Baldwin
Robert B. Smythe

November 29, 1973

VI. CONCLUSIONS

The draft EIS on the Westmoreland Resources mining plan is more a description of an on-going project than an analysis of the foreseeable environmental effects of viable planning options available to the B.I.A. This result stems from an early misconception by the B.I.A. of the utility and purpose of the environmental impact statement requirements. The purpose of an environmental impact statement is both to inform the public of the potentially important effects that a project might have on their lives and the environment and to help federal administrators make the necessary project decisions. But the process of constructing the statement is equally important; if done properly, it will bring to light new data and suggest new conclusions regarding the merits of the proposed project.

This draft, however, reveals no such fruitful result because the data and analysis sought were inadequate. The conclusions that follow below suggest the need for this EIS to present a clear explanation of its relationship to prior commitments, a rationale for its scope of action, and a conceptual framework for analysing the intricate social and environmental cause and effect relationships that would be created by the project. In addition, the conclusions also indicate the critical importance of the section on alternatives to reflect the range of options now available to the B.I.A. and the Crow people depending on which set of social goals is to be pursued.

Comments from the environmental impact assessment project of the Institute of Ecology were 65 pages in length, thereby necessitating abstracting so it could be included in the final statement. The conclusions were utilized as they enumerated the major points of the comments. The responses appear along with the enumerated points.

A. Prior commitments

1. The B.I.A. issued a notice of lease sale in August 1970 without writing an EIS or mentioning the National Environmental Policy Act.

2. The B.I.A. approved the 1972 lease of coal tracts to Westmoreland Resources without writing an EIS, despite the substantial environmental, social and economic questions involved.

3. The result of these actions was to deny to the public, and in particular the Crow people, the opportunity to determine the costs and benefits of the Westmoreland mining operation, and to diminish the subsequent policy options available to the Crow and to the B.I.A.

4. The draft EIS does not discuss the environmental impact of commitments made by federal and corporate parties prior to the submission of a mining plan by Westmoreland.

5. Among the specific prior commitments that the draft should now specifically recount and analyse are:

a. the regulatory scheme governing Westmoreland under the terms of the lease;

b. the Burlington-Northern railroad spur for hauling coal from the mine, the construction of which began before Westmoreland requested mining plan approval.

B. Scope of review

1. The draft EIS limits its analysis to the environmental and social effects of a modest, 4 million ton per year coal mining project designed to employ 125 people, and consequently concludes that adverse effects will be minimal.

2. By taking its narrow view of the proposed project's impact the B.I.A. neglects the fact that:

a. Westmoreland Resources granted coal and obtained water options that strongly suggest coal gasefication prospects in the area;

b. Westmoreland Resources plans a mine with a capacity more than three times that which is analysed in the draft EIS;

c. Other companies, some of which are involved with Westmoreland Resources, plan or are considering major mining expansion and electrical generation and/or coal gasefication facilities immediately west of the Crow Ceded Area and, in fact, throughout eastern Montana, the Dakotas and Wyoming over the next few decades;

d. The federal government's Northern Great Plains Resource Program is presumably developing data and expertise that could be used to place the Westmoreland proposal in the context of future resource/energy policy.

These facts and their relevance to the Westmoreland operation should be fully explained and analysed in the EIS.

C. Discussion of environmental impacts and adverse effects

1. General comments.

The statement is not "a complete document capable of standing alone." Additional information is needed as well as a more integrated interdisciplinary overview.

2. Climate

The meteorological data do not cover a large enough time

A. See Northern Plains Resources Council response no. 1. Also railroad comment under National Resource Defense Council no. 3.

B1 See response Schwechten. Page 54

The major federal action involved is "approval of the mining plan for the proposed Westmoreland Resources coal strip mining operation in Tract III of the Crow Indian Ceded Area, Big Horn County, Montana." A meaningful area wide or regional analysis of possible coal mining operations within the remainder of Westmoreland Resources Tract III or in the Ceded Area cannot be accomplished without specific mining proposals from the companies involved.

B2a No specific proposals for such a project have been made.

B2b The mining equipment has a maximum capacity of 6 1/2 million tons annually. No additional equipment is on order. More capacity in the plant would require substantial additional expenditure.

B2c Response #5 EPA Page 13

B2d The assumption is correct.

C2 Response: Collection of adequate climatic data for the specific mine site was instigated by Westmoreland. However, the period of record is inadequate to predict average climate conditions at the site.

span. Greater specificity is required to make this descriptive section a tool in evaluation.

3. Soil

This section lacks specific information regarding on-site soil chemistry and structure; further analysis of potential salt problems is urged.

C3 Response #7 EPA Page 13

4. Vegetation and wildlife

a. The environmental setting is very superficially portrayed; there should be a more holistic portrayal of the ecological interactions among plants and animal communities and their physical environment.

C4a See response #8 State of Montana Department of Fish and Game. Page 19

b. Important problems associated with revegetation are not explored, including the selection of proper plant species and ecotypes and the duration of external maintenance.

C4b On page 141 of E.I.S., species are discussed.

5. Reclamation

The basic problems of land reclamation are recognized, but the solutions offered appear to be overly simplistic. The need expressed in the EIS for further research is strongly supported.

C5 Refer to responses on North Dakota State Planning Division page 36, also response #3 EPA. Page 13

6. Aesthetics

The brief discussion indicates a lack of understanding of the scope of aesthetic impacts.

C6 Aesthetically a strip mine site cannot be construed to be a Garden or Eden nor a Den of Iniquity, but must be accepted for what it is. To some it is an intrusion upon the natural environment, while to others it is a beneficial natural resource recovery method.

7. Water

a. The effects of mining operations on the magnitude of surface run-off are not calculated.

C7a Response: Increased infiltration indices are anticipated for the reclaimed overburden spoils material. A slight lowering of the land surface, except for box cut spoil bank, after mining and reclamation is also anticipated. These factors combined with flood control operation of the sediment detention dam will preclude any appreciable increase in flood magnitude or sediment contributions downstream. The surface water monitoring program will indicate future deviations from natural conditions which are now being monitored.

b. The potentially destructive levels of flooding and sedimentation in the settling pond and on Sarpy Creek are largely overlooked.

C7b Since positive retention of flood waters of extreme magnitude (in excess of 100 years) is provided for by the sediment detention dam and appurtenant outlet works, the possibility of adverse downstream impact is extremely remote. This is particularly evident in view of the fact that releases will not be allowed from this structure until the water quality meets or exceeds the applicable State of Montana Water Quality Standards.

c. The questionable groundwater sources for project needs as well as the regional impacts of using this water need further investigation. Disposal of mine drainage water is not discussed.

C7c An extremely deep well source (± 8,000 feet) tapping the Madison limestone aquifer will be utilized to supply the water requirements of the Westmoreland mine. Since there is no hydraulic connection of this aquifer with the shallow aquifers (± 250 feet in depth maximum) affected by the mining operation depletion of shallow water supplies will not occur from this use. Mine drainage water will be disposed of in the settling-detention pond.

d. No discussion of future water problems for deep mining operations is included although it appears that these problems will be exacerbated by this project.

C7d Although several thin coal seams of poor quality underlie the Robinson coal seam, in the Lebo and Tullock formations, it would be economically infeasible to mine them by underground mining methods. However, assuming they could be mined, the presence of existing aquifer systems under large hydraulic pressures in hydraulic continuity with these coal seams could create a natural mine drainage problem. No adverse hydraulic problems from the presence of a previously strip mined area would be anticipated unless mine caving and subsidence of the overburden occurred due to inadequate support of the mine roof.

8. Air quality There appears to be a potentially serious hazard to the environment and to human health from excessive amounts of fluorine in coal to be mined at this site; a detailed analysis should be undertaken prior to commencing any mining operation.	C8 See response to EPA no. 1. Page 12
9. Socio-economic impacts	
a. The draft EIS employs deceptively simple and unsupported employment "multipliers" that lead to errors regarding the likely employment and income benefits of the proposed mining operation to the region.	C9a See response # 2 & 3, Northwestern University. Page 33
b. The draft EIS fails to assess how the job training program, to be initiated by Westmoreland after its mining plan approval, would	
i. reconcile cultural values of the Crow with work values of a modern industrial society;	C9b i See response #3, Northwestern University. Page 33
ii. guarantee that the Crow people would obtain net decreases in their present unemployment or underemployment condition;	C9b ii See response no. 4, Schwechten. Page 55
iii. guarantee that Crow people will in fact receive preferential employment by Westmoreland Resources in the long run if the region experiences a predictable influx of job seekers with substantial work experience and industrially compatible values.	C9b iii See response #3, Northwestern University. Page 33
c. The draft EIS does not incorporate data on relevant B.I.A. job training experiences elsewhere and other studies of poor minorities.	C9c Relevant job training programs that should be considered in this instance are those associated with the prime contractor responsible for training the Crow Indians, Morrison-Knudsen Co. Previous experience of this company with Indian preference hiring experience and continuing Indian employment on the railroad spur line servicing the Black Mesa coal mine in northeastern Arizona was gratifying. Overall Navajo Indian employment on this project during the peak construction period of 1972-73 ranged from 39 to 56 percent of the total work force. Considering the short term nature of this project and the minimal opportunity for job training this would provide, the employment program was considered to be reasonably successful. Present employment levels for Indian workers attained by Morrison-Knudsen Co. for the industrial mining group, which is to be retained on the Westmoreland Resources Project after construction is complete, have ranged from in excess of 50 percent to a present level of about 40 percent. The reason that the existing Indian work force for this group is down has been the loss of newly trained personnel with marketable skills to higher paying construction jobs on highway projects and at Westmoreland and Colstrip mines where new plant and dragline construction is in progress. During mining there will be about 90 jobs relating to this project. Approximately 56 of these will be in the trades and 34 supervisory. Assuming that the existing 37 Indian employees in the Industrial Mining Group of M.K. remain, they will comprise 47 percent of the total mine employment. It is the intent of Westmoreland to raise this percentage of Indian workers as much as possible in the future.
d. The draft EIS fails to discuss and analyse the extent to which the Crow people may obtain secondary (retail and service) employment resulting from the Westmoreland operation. Nor does it address the measures that B.I.A. might take to help insure such secondary employment benefits to the Crow.	C9d Employment Assistance, of BIA, is an ongoing program at Crow Agency designed to meet this need.
e. The draft EIS fails to analyse the effect on the Crow people who might have learned the necessary heavy construction techniques after the mining operation is completed, in some 20 to 30 years, or how this forseeable event would affect their grazing and agricultural way of life.	C9e If these particular jobs play out, the workers should be able to obtain jobs in other mines or related type industries.

f. The environmental effects of the possible influx of population, coming to serve even moderate levels of mining, electric generation and gasefication in the Northern Great Plains states, were not assessed in the draft EIS. The profound social changes that coal development can be expected to cause in the region were similarly neglected in the draft.	C9f See response #a, Schwechten. Page 55
g. The draft EIS completely underestimates the opportunity costs of mining.development in the region because:	C9g See response #1, office of the Assistant Secretary of Commerce. Page 17
i. It discusses only the historic "market value of lost agricultural production," and not the probable higher prices for farm goods, evidenced by what the draft calls "current peaks."	C9g i See response on hearings, page 9
ii, It neglects to discuss the effects of presently uncertain reclamation successes or the effects of additional mining activities.	C9g ii Montana strip mining and reclamation act of 1973 is applicable. Additional mining activity will necessitate a new assessment to determine if an environmental statement is needed.
D. Alternatives 1. The draft fails to present and analyse a range of alternative policies that might be most beneficial to the Crow people such as renegotiation of coal lease terms or the development of other non-coal development economic patterns that might produce long-term stability.	D1 Response #3, Northern Plains Resources Council. Page 38
2. Deep mining possibilities and alternatives to the immediate stripping plan of Westmoreland were largely ignored by the draft EIS despite the prospects that coal production and Crow royalties might be increased and stretched out over a longer period if deep mining preceded stripping.	D2. There are no commercial coal seams below the Robinson bed. U.S.G.S. Bulletin no. 749 states, "The thin seams below the Robinson bed have little value." If some unknown commercial beds were found, the U.S.G.S. states that they would prohibit mining of those beds to protect and conserve the upper beds. Underground mining of thick beds near the surface is not practical for safety, conservation, and environmental reasons. In underground operations, normally no more than ten feet of a thick coal seam is mined. If the coal seams near the surface were mined by underground methods, caves would appear on the surface for several years after the mining. This would do more environmental damage than surface mining. U.S.G.S. staff indicate that strip mining should precede underground mining if both methods are used at a specific site.
In addition to the above conclusions, the Institute for Ecology emphasized: Ammonium nitrate for blasting will have environmental effects and will use a resource in high demand.	It is acknowledged that approximately 50,000 tons of ammonium nitrate will be consumed during the 20 year life of the project. There will be an extremely small amount of ammonium nitrate remaining in the overburden after blasting.

Comments of the

Natural Resources Defense Council, Inc.

on the

CROW CEDED AREA COAL LEASE
WESTMORELAND RESOURCES
MINING PROPOSAL

Draft Environmental Statement

(DES 73-59)

The lengthy commentary on DES 73-59 submitted by the Natural Resources Defense Council, Inc., is not presented in its entirety. Instead, the main points raised in the text have been extracted and responded to. Copies of the full text as referenced below are on file at the BIA Planning Support Group Office in Billings, Montana.

I-INTRODUCTION

1. Comment: -------"the deficiencies in the DES are especially serious in light of the substantial preparations, involving removal of surface vegetation and construction of a major portion of the 36-mile railroad spur that have already taken place and the apparently imminent initiation of soil removal and mining. 2/

These activities appear to violate the Guidelines (38 Federal Register 20550) that have been promulgated by the President's Council on Environmental Quality (CEQ) pursuant to its responsibilities under NEPA to advise federal agencies on the preparation of environmental impact statements:-------"

1. The Bureau adhered to NEPA and CEQ guidelines following the Davis vs. Morton reversal in 1972 and the subject EIS has been prepared in accordance with these guidelines. See more complete discussions under the Northern Plains Resource Council comments.

II

"THE DRAFT STATEMENT DOES NOT ADEQUATELY IDENTIFY AND DESCRIBE THE "ACTION" REQUIRING AN ENVIRONMENTAL IMPACT STATEMENT"

2. Comment: "The DES does not, as it should, clearly indicate the "major federal action significantly affecting the quality of the human environment" that requires the preparation and circulation of an environmental impact statement under NEPA. The description of the action to be covered is described in the DES "Summary" (p. vi) as the

> "(a)pproval of the mining plan for the proposed Westmoreland Resources coal strip mining operation in Tract III of the Crow Indian Ceded Area, Big Horn County, Montana."

On page three it is further asserted that the DES

> ". . . concentrates on specific studies for a proposed strip mining operation planned by Westmoreland Resources and how it will affect the land within their lease on Tract III of the Ceded Area."

Evidently the purpose of the contemplated strip mining is the provision of "cleaner" low-sulfur western coal for Midwest power plants that cannot economically install scrubbers to remove sulfure dioxide from stack gases during the combustion of high-sulfur Midwestern coal."-----

Alternatively, the DES states ". . . that the primary purpose of leasing this particular coal is to provide income and employment opportunities to the Crow Tribe."---------------

2. The major action per NEPA is the approval of the mining plan. The reason for mining Indian coal is to generate employment and income for the Crow Indian Tribe.

3. Comment: If this means that the "major federal action" is BIA's approval of the surface mining operation, then BIA's authority and competency for approving the "operation" should be specifically identified and compared, for instance, to the USGS Mining Supervisor's power to approve mining plans under 25 C.F.R. Part 177.7(a).

3. The Bureau of Indian Affairs reviews the mining plan and recommends, to the U.S.G.S. Mining Supervision, for or against approval.

III

"THE DRAFT STATEMENT DOES NOT DISCLOSE THE REASONS THAT ON- AND OFF-SITE DEVELOPMENTS WERE PERMITTED PRIOR TO COMPLETION OF THE NEPA REVIEW PROCESS"

4. Comment: "It is unclear under whose authority (1) the Burlington Northern Railroad constructed a spur to the Sarpy Creek area, and (2) Westmoreland proceeded to engage in premining, on-site construction activity.-----------"

4. The Burlington Northern Railroads construction of a spur line into the Sarpy Creek area was upheld by a federal court and the ICC, no federal approval was required. The Burlington Northern filed an Environmental Impact Statement with the State of Montana. Approval of the state land board was required prior to construction.

The Bureau did not consider the NEPA review process applicable to Indian land prior to the Davis vs. Morton decision of November 24, 1972; therefore, U.S.G.S. approval of the Westmoreland mining plan was the only action required by the federal government. A formal opinion, issued by the Attorney General for Montana on August 8, 1973 (Volume 35, Opinion Number 20), stated that construction does not constitute strip mining as defined under the Montana Strip Mining and Reclamation Act.

IV

"THE DRAFT STATEMENT IS TOO RESTRICTED IN SCOPE AND FAILS TO CONSIDER CUMULATIVE ENVIRONMENTAL IMPACTS"

5. Comment: "We find the BIA to have taken an unnecessarily and unacceptably limited approach in the preparation of the DES. Rather than preparing the detailed, comprehensive draft EIS required by NEPA, the BIA has apparently restricted the DES to the initial Westmoreland mining plan that covers the removal of only 77,000,000 tons of coal out of the estimated total Tract III stripable coal reserves of 625,000,000 tons.---------

Furthermore, the DES does not even cover the 20 year period that will be required to remove the entire 77,000,000 tons of coal; instead, it appears to be limited to the first five years described in Westmoreland's current mining plan, during which about 19,000,000 tons of coal will be mined.---------

Furthermore, the DES does not contain an explanation for the separate publication of the 1972 environmental statement on the Burlington Northern Railroad spur to the Sarpy Creek area and the July 1973 environmental impact statement on the proposed Pig's Eye Coal Terminal in St. Paul, Minnesota, prepared by the Corps of Engineers.---------"

5. The major federal action stated in the summary requires an EIS covering only the mining of 77,000,000 tons of coal over a 20 year period.

It was acknowledged in the DES (page 9) that the Westmoreland mining plan submitted covers only the first five or six years of mining activity. If additional contracts are made to sell more than the 77,000,000 tons, a revised plan will be needed. At that point in time the requirement for an additional environmental impact statement(s) will be assessed.

The Federal Government had no jurisdiction over construction of the railroad spur as noted previously.

The Pig's Eye Coal Terminal EIS is irrelevent to the contractural obligations of the parties involved in the sales contracts. The approval of the terminal is therefore not germaine to a decision on this particular mining project.

V

"THE STATEMENT FAILS TO INCLUDE OR DESCRIBE FULLY WESTMORELAND'S MINING PLAN"

6. Comment: "The statement repeatedly refers, often in vague terms, to Westmoreland's mining plan, but the plan itself is not reproduced. The plan should be included in an appendix so that reviewers of the DES can apprise themselves precisely of Westmoreland's proposed mining and reclamation procedures.---------"

6. The Westmoreland Resources mining plan was referenced in the DES. Inclusion of this several hundred page document, presently entitled "Application for Mining Permit, Sarpy Creek Mine, Westmoreland Resources" and supporting data cannot be included as an appendix. However, copies are available for public review at the following locations:

(1) Billings, Montana

(a) Westmoreland Resources

(b) U.S. Geological Survey

(c) BIA, Planning Support Group

(2) Helena, Montana

(a) Department of State Lands

Sufficient detail from the mining plan was presented in the DES for public review purposes.

VI

"THE STATEMENT FAILS TO SPECIFY AND DISCUSS ADEQUATELY APPLICABLE RECLAMATION LAWS AND REGULATIONS AND OTHER ENVIRONMENTAL PROTECTION LAWS"

7. Comment: "The DES vaguely refers throughout to reclamation laws and regulations but nowhere are the applicable laws or regulations specifically identified.-------------"

Comment: "Several specific questions about the lack of adequate disclosure of relevant anti-pollution laws and regulations deserve special mention. For instance, the DES should discuss any tribal laws or tribal charter provisions concerning protection of the natural resources, which may regulate Westmoreland's operations. The DES should also specify whether or not the provisions of 25 C.F.R. Part 177 are to be fulfilled even though the surface is privately owned and thus explicitly exempted from Part 177 requirements. That is, does the BIA apply Part 177 regulations to private surface mining in the same fashion that the BLM applies the regulations of 43 C.F.R. Part 23 to privately owned surface?

Additionally, the DES should clearly state whether or not the lessee will be made to comply with state and federal air and water pollution laws, and describe how such compliance, if required, will be guaranteed or policed.------------"

7. The section on environmental controls and legislation in Chapter IV of the DES adequately outlines the applicable laws and regulations which apply to the Westmoreland mining proposal.

VII

THE DRAFT STATEMENT DOES NOT ADEQUATELY CONSIDER THE PROBLEM OF LAND RECLAMATION

8. Comment: A. The Reclamation Plan

The methodology for "reclaiming" semi-arid surface mined lands is not well-established. Indeed, intensive research of the factors that potentially affect the chances of revegetation success has just begun. Although some important ameliorating procedures have been identified, the primary implication of studies to date is that substantially increased research efforts must be made before reclamation can become a predictable activity.----------

8. To date the Crow Tribe has not found it necessary to supplement federal and state environmental protections with their own regulations. Westmoreland Resources has agreed to abide with all applicable regulations. Due to the private ownership of the land in the ceded area the state will maintain jurisdiction over the bonding.

9. Comment: B. Reclamation Laws and Regulations

The vagueness of the DES about the reclamation plan is partially a result of a failure to discuss in detail the requirements of state and federal reclamation laws and regulations.

The DES, for instance, should reveal the results of the technical examination required by 25 C.F.R. Part 177.4(a) and should set out the general requirements for the protection of non-mineral resources which the Superintendent was required under 25 C.F.R. Part 177.4(b) to give to Westmoreland in writing before the original prospecting permit was issued.----------

Federal regulations require BIA, in conjunction with USGS, to make an independent determination of mining feasibility and reclamation requirements in order to carry out properly its trust responsibilities to the Crow Tribe. The results of its independent determination should be set out in the DES.----------

9. There is no valid reason that research cannot be conducted during the initial phases of individual projects due to the uniqueness of the various sites.

If the identified reclamation problems are properly handled, the outlook for satisfactory reclamation, with respect to this project, is promising.

10. Comment: C. Monitoring Compliance with Applicable Laws and Regulations

The DES discloses virtually nothing about plans for monitoring and enforcement. We are assured that the mining plan approval will include "such stipulations and requirements as to ensure that the plan will be followed as set out." This blank assurance falls far short of NEPA's requirement of careful, detailed assessments.

The DES should disclose whether, how often and by whom inspections of the mine will be made and whether, how often and what kind of resports will be required. For example, the statement does not, but should, reveal whether the reporting requirements of 25 C.F.R. Part 177.9 will be enforced. Further, what provisions, if any, will be made for consultation and coordination with USGS, state and tribal officials? Will the BIA leave enforcement responsibility totally to USGS, as the statement implies, even though the Superintendent has the right to inspect and investigate compliance under 25 C.F.R. Part 177.10?

10. BIA in conjunction with USGS has prepared the EIS which includes the technical assessment as required.

11. Comment: D. Reclamation Costs, Bonding and Cost-Benefit Analysis

Related to the monitoring and enforcement questions skipped over in the DES is the fact that virtually nothing is revealed about reclamation costs. The estimated cost is important for several reasons. First, it provides an important clue to the difficulty of reclamation and the likelihood of success. Secondly, it provides the basis for a cost/benefit analysis to determine the economic feasibility of varying degrees of reclamation.-----------

Finally, and most importantly, the reclamation cost estimate is critical for setting an adequate reclamation bond, required by 25 C.F.R. Part 177.8 to be in an amount "sufficient to satisfy the reclamation requirements established pursuant to an approved exploration or mining plan . . ." The failure of the DES to disclose or set a bond amount and to discuss reclamation costs is a serious deficiency that should be corrected in a recirculated draft statement.

The DES should indicate in what amount a bond for the prospecting permit was posted under 25 C.F.R. Part 171.6(c)---------"

11. Compliance with regulations affecting the USGS is the responsibility of that agency and will be handled by them. All of the requirements of BIA regulations will be enforced. Coordination and cooperation with the USGS and the various tribes is continuous. The lessee has indicated willingness for ready compliance with state regulatory and statutory provisions where applicable. State must grant annual renewals of mining permits if mining is to continue.

VIII

"THE DRAFT STATEMENT INADEQUATELY CONSIDERS THE SOCIAL AND ECONOMIC IMPACTS OF THE PROPOSED MINING"

12. Comment: "The detailed environmental statement required by NEPA must consider off-site and secondary impacts of the proposed action. Unfortunately, the DES contains neither the information base nor the detailed analysis required to assess fully these important secondary population and growth impacts on the communities on and surrounding the Ceded Area. 46/

The DES asserts that about 40% of the "resident Crow Indian families" are classified in poverty. (p. 39) Unfortunately, the exact set of families considered is not specified: the 40% figure could apply to the Ceded Area, Big Horn and Treasure Counties, the Crow Reservation, or a combination of these. 48/ ----------

The important problem of the economic costs of growth to the local communities is not confronted fully and forthrightly. The DES should consider the costs of providing, for instance, increased police and fire protection, more and improved roads, more classrooms, greater sewage handling capacity, more health care facilities, more electricity and the entire range of other municipal and county services in order to accommodate an increased population. 52/ That the local communities may have difficulties meeting these increased demands on public services is even hinted at in the DES. ---------"

12. Westmoreland has promised the best reclamation possible at any given time. The cost of reclamation over a period of years will be a substantial figure. During the life of the lease, it will be in excess of one million dollars. Westmoreland will also be filing a bond on lands effected by activities related to mining such as lands upon which permanent facilities have been installed including cost of dismantling.

IX

THE DRAFT STATEMENT DOES NOT ADEQUATELY CONSIDER REASONABLE AND ENVIRONMENTALLY LESS DAMAGING ALTERNATIVES

There are two main purposes of Westmoreland's proposed surface mining in Tract III of the Ceded Area: (1) to generate income and employment for the Crow Indians and (2) to supply low-sulfur coal to Mid-western power plants.-------

13.	Comment: A. Income and Employment Alternatives The DES should fully explore alternative contractual agreements between Westmoreland Resources and the Crow Indians that would maximize income and employment opportunities for the Crow Tribe. For instance, the DES should explain (1) why a higher royalty cannot be paid to the Tribe, (2) why the Indians are not guaranteed 50% of the jobs at the mine rather than only given an "opportunity" to compete with them, and (3) why Westmoreland is not providing funds to offset the likely increase in costs that will be borne by resident tax payers for providing public services such as police and fire protection, medical care, schooling, sewage treatment, etc., to the larger population induced by mining activities.	13. The major requirements for local services will be schools and resurfacing a portion of the county road. It is expected the tax base will cover these costs but the timing may not coincide. There will be economic costs incurred by the local communities but these costs should not be extensive. The Hardin Chamber of Commerce and Big Horn County officials have certified that benefits received to date have exceeded costs. Their comments are part of the appendix.
14.	Comment: B. Mining Alternatives The DES argues that increasing the amount of coal extracted at existing mines would result in significantly less environmental degradation: "The confinement of strip mining activity to those areas already developed, which are conducive to favorable mining conditions, could have a lesser environmental impact since virgin territory would not be involved. There is also merit in comprehensive large scale development planning for a limited number of mining areas. Among the advantages are: (1) better utilization of existing service, transportation, and community facilities; (2) confinement of possible pollution problems to fewer areas, etc." Yet almost incredibly, the DES shrugs off this environmentally more sound alternative without further discussion and analysis: "However, in view of projected electrical energy consumption and enforcement of air pollution standards in heavily industrialized areas of the midwest the demand for low sulfur western coal may outstrip the production and expansion capabilities of existing mines." (p. 183) At the very least the detailed projections of (1) demand for low sulfur , western coal and (2) maximum possible production rates of existing mines should be fully presented in order to support the claim that additional coal mining capacity is needed.	14. (1) Higher royalty payments may be negotiated by the parties to the lease. (2) The contractural agreements between the Crow Tribe and Morrison-Knudsen Company pertain only to the preferential hiring and training of Indian personnel. (3) Payment of corporate taxes to Federal, State and County governmental entities as well as Federal and State grants to impacted communities will alleviate much of the increased costs.
15.	Comment: The discussion of underground mining as an alternative to the proposed strip mining is wholly inadequate -- consisting primarily of a statement that the Rosebud-McKay and Robinson coal beds cannot be economically recovered by underground mining -- and should be substantially expanded in a recirculated draft EIS.-------------- The DES provides only hints that significant amounts of coal may lie far (several hundred feet) below the surface. Unfortunately, no detailed information is presented about the amount and quality of coal in the Lebo shale and Tullock formations. If significant coal deposits exist in these deep formations under Tract III, then the recirculated draft statement should consider the alternative of mining these deep deposits prior to surface mining.	15. This would not be a viable alternative to the Crow Tribe which through its own self-determination has committed itself to the development of coal mineral rights on Tract III of the Ceded Area owned by the Tribe. In Montana the four coal mines operating or proposed will be producing about 30,000,000 tons of coal per year or more by 1980. In Wyoming there are five mines operating or proposed which may also be producing about 20-25 million tons of coal per year by 1980.
16.	Comment: C. Reclamation Alternatives At least two types of alternatives to the vaguely outlined proposed reclamation scheme should be considered in a recirculate draft EIS. First, alternative land uses of the reclaimed area should be evaluated. For instance, the question of whether the mined area could serve as a solid waste dump should be answered. Alternatively, the suitability of the reclaimed site for commercial purposes, intensive recreation and home sites should be determined. These are important considerations because reclamation procedures must be adjusted to the planned uses of the land. Second, alternative means of returning the mined land to its current use should be thoroughly considered. The conclusions and recommendations of the Natural Resources Defense Council, Inc. are presented below in their entirety.	16. In this instance underground mining methods cannot be utilized to recover the Rosebud-mcKay and Robinson coal seams. The relatively thin (50 to 200 feet) overburden thickness would present severe hazards to miners; prevent high coal recovery levels resulting in excessive production costs; and would create severe surface subsidence problems. Exploritory test holes indicate that there are not significant seams of coal in the Lebo and Tullock formations. See comments on Environmental Impact Assessment Project.

X

17. Comment: CONCLUSIONS AND RECOMMENDATIONS

Carefully prepared, comprehensive environmental statements can do much to ensure that environmental values receive proper attention during agency decisionmaking and to assist the agency in implementing our national policy to protect and enhance environmental quality. Mere preparation of a NEPA statement, however, is no substitute for adequate decisionmaking. Unfortunately, this draft environmental statement suggests a lack of concern for the NEPA requirement that federal agencies fully assess proposed actions and reasonable alternatives and to take all practicable means to minimize adverse environmental effects and to protect environmental quality. For the reasons set out in detail above, NRDC believes that this DES is so deficient in its discussion of both environmental impacts and alternatives that at a minimum, prior to the commencement of mining operations, the BIA is required to issue, and to circulate for comment and review, a new draft environmental statement which remedies these inadequacies.

18. The BIA, in consultation with other federal agencies that have responsibility relating to the mining and transportation of coal, should carefully reassess its approach for meeting the environmental protection and the public-participation-in-agency-decisionmaking requirements of NEPA. In particular, serious consideration should be given to holding the proposed mining of Tract III in abeyance until a comprehensive, draft EIS can be prepared that fully considers the cumulative environmental effects of developing the regional coal deposits, including the operation of gasification plants and other mining related facilities. The procedure of going from the general over-all statement to more restricted environmental statements on individual mining leases and plans allows a more orderly, comprehensive analysis of potential environmental harm and provides a greater opportunity for planning to avoid, or at least minimize, environmental degradation and waste of natural resources.

17. Surface is privately owned; therefore, alternate uses will depend on the decisions of the landowners subject only to local governmental zoning and control. Research on alternative means of returning mined land to current or improved usage is presently being conducted by Westmoreland and other corporate and governmental entities.

18. As regards the request for a regional environmental statement studying the cumulative effects of coal development, the Northern Great Plains study now being conducted, with the U.S.D.I. as the lead agency, will adequately cover this.

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November 3, 1973

Mr. Wayne E. Stephens
Director, Planning Support Group
Bureau of Indian Affairs
Billings, Montana

In re: Crow Ceded Area
Coal Lease - Westmoreland
Resources Mining Proposal:
Draft Environmental
Statement.

Dear Mr. Stephens:

We feel that there are some serious deficiencies in the draft environmental impact statement and also in the mining proposal itself. We feel that these deficiencies are so serious that the BIA should either cancel tbis proposal entirely, or substantially revise the proposal and then submit an entirely new draft environmental impact statement.

1. In the first place, we believe that the BIA has, once again, found itself with a conflict of interest. On the one hand, as the introductory paragraph illustrates, the BIA, as an agency within the Department of Interior is strongly interested in solving the so-called energy crisis by rapid development of Fort Union coal. But you also owe a trust obligation to the Crow Indian Tribe. In this case, when the interests of the Crow clash with the interest in developing the coal, the Crows lose. That is in the great and well known BIA tradition, of course. Fortunately for the Crows, and the non-Indians in the area, the so-called coal leases of June, 1972 seem to be illegal and void, and so any coal mining on Tract III will have to be renegotiated. The belated appearance of this environmental impact statement amounts to an acknowledgement that these developments are in fact likely to have a major environmental impact, requiring the NEPA procedures. But NEPA and the CEQ guidelines make it unambiguously clear that tbe impact procedure must be complied with prior to any major action on the project such as these illegal leases. Therefore, the contract should and must be renegotiated. It ought to be renegotiated on terms which are far more favorable to the Crow. These more favorable terms should include substantially more money, and serious contractually imposed requirements upon Westmoreland to ameliorate the social, cultural, and environmental disruptions this development will create.

2. (1) Social and Cultural Impacts - Our first concern, in particular, has to do with the social and cultural disruptions this developmant will create, for Indians and non-Indians alike. We think that the evaluation concerning such disruptions is entirely inadequate. It is generally recognized that urbanizacion and industrialization in a rural society impose special problems. They need to be anticipated and considered, not only for the Indian community but for the possibly impacted communities of Hardin, Hysham, Lodgegrass, Sanders, and Crow Agency. Although the proposal does not project a vast population increase for these towns, any increase at all will have serious social and cultural repercussions. We suggest that the final EIS consider that the development will affect family stability, life style choices, crime and social disorder, rates of alcoholism, and the levels of happiness and aspirations for both the Crows and the non-Indian inhabitants of the small towns in the area. It can be anticipated that increased levels of employment would lead to greater mobility and more social choice, which, in turn, would lead to a departure from traditional social and cultural life styles. If this is the case, do those people involved wish for this to happen? Also, the development would probably lead to increased social pluralism, so that traditional forms of family life and authority would be seriously threatened. Some of these things may be occuring anyway, as communities in Montana become integrated into the urban control structures of American society. But the changes precipitated by even the low level of industrialization and urban growth predicted in the EIS for this first stage will sharply increase and magnify these changes, as the communities lose control of critical decisions to corporations and government agencies far away, and as the communities come to be places of strangers.

3. Moreover, we think that the hiring and operating plans of Westmoreland et al are in their interests, and not in the interest of the Indians. The proposal calls for the hiring and training of some Indians. That whole thrust is misplaced. The clear assumption is that the Indians should alter tbeir ways to become the types of workers that the mining contractor would like. Your EIS reports (page 94), "The training program includes continuing education and training to develop a sense of responsibility among the Indian work force." On page 95 you say, "Later, as the Indian training program develops a responsible work force, the Indians will move into openings created by workforce turn-over and by future expansion of the mining operation." Rather than attempting to remake the Indians in the mold of a European-stock urban work force, we strongly urge that the industrial enterprise should be shaped around the Crow's value system. You do not provide nearly enough information on Crow values to fully know what might be appropriate, but you do quote a Crow that "personal gain and the accumulation of private wealth has little prestige value in Crow communities." You say, on page 36, that this is an accurate description. That implies, to us, that the Crow workers may prefer an occupation in which they work until they feel that they have made enough for awhile, and tben prefer to do other things. For any number of reasons which might seem inexplicable to those geared to American industrial management, the Indian workers may prefer a working arrangement rather than becoming part of a "responsible workforce." For example, Indians ought not to be subject to disciplinary action for taking time off when they need to for tribal, familial or otber cultural reasons. Being familiar with other training programs for native Americans, principally BIA's SIPI in Albuquerque, New Mexico, we recommend that both PINTO and future employment by Westmoreland be more sensitive to the various needs of the workers. Surely, Westmoreland and PINTO could accomodate their requirements to the labor force's cultural obligations, interests and values. At best, such efforts can only partially reduce the impacts of bringing a complex technical process to these people. For the industrially induced division of labor which will occur will inevitably mean among other things, that present authority patterns and community cultural obligations will be increasingly overlain with a different and conflicting set of norms and obligations of the urban, industrial world. This will probably lead to increased social disorganization among the present population in the area. Every effort should be expended, by the BIA, acting in its fiduciary capacity for the Indians, to mitigate and reduce the disruptive effects of this enterprise. There is nothing in the impact statement to suggest that this duty is being fulfilled.

1 - The first paragraph of the EIS has been changed to give more emphasis to the primary purpose of developing the Indian coal resources for the benefit of the Crow Indian people.

1. The purpose of the EIS is to appraise and document the environmental impact of a mining development in an area in which the surface is in fee ownership and the tribe owns all coal rights. It is not on the present Crow Reservation.

The EIS has no responsibility for appraising the efficiency of the Bureau of Indian Affairs past, present, or future federal programs relating to Indian tribes. The conclusions related in the opening paragraph are not relevent to the purpose of the impact assessment document.

2 - The scale of employment of the Westmoreland operation (approximately 90 employees) by itself does not imply a high level of social disruption or serious straining of community service facilities and institutional structures. It is anticipated that 80 percent to 90 percent of the total work force will be local employees who will not change their place of residence. The skills learned will probably lead to stability in employment and give employment benefits much longer than the 20 to 30 years discussed. The coal reserves in the area are so great that they will not likely be fully extracted for many years beyond the 20 year planning period of this mine.

3 - Criteria for hiring, solving problems, labor disputes and selection of appointees, were developed between the Crow Tribe and the mining contractor by negotiation and coordination. Negotiation sessions are called whenever new problems arise. Occupational candidates are presently being selected and an excellent working relationship has been established between the tribe and the mining contractor. The tribe and its people should be allowed self determination and be able to select the type of occupation they want or need.

There is nothing in this impact statement to indicate that the BIA is doing anything to anticipate or ameliorate the social problems which this type of development will inevitably create. Your "concern" over social consequences is well illustrated by your discussion of "Unavoidable Adverse Environmental Effects" (Chapter 5) when you discuss "social impacts." You write, (p. 155) "The sdverse social effects of any endeavor or development can he measured only in terms of the inhibiting characteristics of social change on reaching social goals" (sic). That totally defies interpretation. You continue, "With a planning process designed to effectively use tribal income, adverse effects can be quantitatively predicted and their significance evaluated." We can interpret this sentence. It suggests that the trihe ought to use some of its royalty payments to assess the adverse social impacts, which, you assert, can be quantitatively predicted and evaluated. We suggest that you are required by law to sssess the adverse effects as part of the impact statement. The responsibility cannot be shucked off onto the tribe, for sometime after the proposal has become operative.

There are other problems with the proposed hiring policies of Morrisoo-Knudsen. You write "In view of the Morrison-Knudsen record of successful training and employment of Indians and Crow and other reservations, it is safe to estimate that substantially over 50 percent of the positions at the mine will be filled by Crow Indians." It is absurd to leave that as a "safe estimate." The just released U.S. Civil Rights Commission staff report on the Navajo reservation clearly and unmistakably indicates what little value the promises about Indian employment on strip mining and energy projects can become. If, indeed, it is a "safe estimate" that better than 50 percent of the employees will be Crow, then Morrison-Knudsen ought to be under no difficulty in guaranteeing, as a term of the contract, that better than 50% of the workers will be Crow Indians. We would expect it to be necessary to impose some severe penalty upon the company (whether 3a Morrison-Knudsen or Westmoreland, we care not), for non-compliance with this term of the contractural arrangements to be entered. We understand that there may be initial problems for the company in achieving this rate, so suggest that it not become effective until the second year of the contract. By the third year we believe the contract also ought to mandate that at least 50% of the supervisory and management positions be filled by Crow Indians. We even suggest the desirability that the Crow supervisory and managerial appointees should be selected by the Tribe, rather than the company, using tribally determined criteria.

3a See response C9c to Environmental Impact Assessment Project. Page 26

We understand that there may be some difficulty in getting Westmoreland, et al to agree to such conditions. But as much should be extracted from the companies as possible. The companies appear to be at some disadvantage in any renegotiation of these leasing and mining agreements, de nova, as they have fairly heavy sunk investments in Ceded Area Tracts II and III, as well as contractural obligations to deliver coal. As a fiduciary, acting on behalf of the Crow, it is your duty to press this negotiating advantage as far as it goes. If, because Department of Interior policies concerning coal development, solving the "energy crisis," etc. interfere with the BIA's ability to act in the interest of the Crows, then it seems to us that the BIA ought to withdraw from any role in determining this matter, and have the Crow represented by others who can genuinely act on behalf of the tribe.

4. (2) Impact on Race Relations - It seems almost certain that one of the byproducts of the development as outlined in the draft environmental statement, will be increased racial hostility and friction. Whatever the present accommodations as between the Indians and whites in this area, they will become unstuck as many new white workers move into the area, and come into work and other contact with the Indians. The respective ways of white urban workers and the present local population (both Indian and non-Indian) will almost certainly be mutually incomprehensible, to some degree. That condition breeds fear and distrust. But when you add to that the fact that the white newcomers will have higher education, more skilled and responsible work, and more money than either the Indian, or much of the present non-Indian population, you add up the conditions for volatile racial relations. It is abundantly clear that much of the current tumultuous state of Indian-white relations, as illustrated by Wounded Knee, can be attributed to the impositions of an urban American industrial state upon people whose values are different. With stripmining and its ancillary developments, that urban industrial state is going to be right there in Crow Agency and Hardin, Montana.

4. That the Westmoreland project will increase racial tensions appears to be a pre-judgement derived by unfamiliarity with the proposed project. Most of the Indian and non-Indian workers will have had considerable experiences working in bi-racial situations. It is not logical to assume that this project will either increase or decrease any racial tensions that may exist in the area.

As indicated in the statement, it is expected that training and counseling will forestall any serious tensions. The communities in the area all have varying degrees of racial mix and appears to be managing any differences in an acceptable manner.

The Crow Tribe has nearly as high an educational level as the surrounding area urban or rural. Eighty to ninety percent of the employees will be local so few if any urban whites will be brought in.

5. (3) Fiscal and Political Impacts - We think you greatly understate and misstate the consequences of the development upon the adjoining communities, where people associated with the development will live such as Hardin. You assert, on page 18, that "the increased tax base would permit expansion of necessary community facilities." But it appears that the industrial developments may not be located in some of the taxing jurisdictions where people will live. If so, it is probable that the increased public expenditures for schooling the newcomers, policing them, etc. will not be paid through any adequate increase in the tax base of the responsible jurisdictions. If the Westmoreland developments are going to have the asserted impacts on adjoining communities, then Westmoreland ought to be required to make some payments in lieu of taxes to these jurisdictions for the costs of public service that the development creates. For, apart from a very small number of merchants, all the accumulated evidence is that the present residents of these towns will receive absolutely no monetary benefits from these developments whatsoever The jobs and wealth will go to newcomers. The old residents will simply bear a large part of the coats.

5. The question raised relative to the proper distribution of benefits and disbenefits between jurisdictions is a universal one. The State of Montana is addressing itself to such problems on a statewide basis. The efficiency and justice of different procedures has been a heated issue for many decades throughout the nation. (see attachment to the letter from Hardin Chamber of Commerce dated November 6, 1973)

6. Incidentally, we think that your analysis of the demographic data is inadequate. Your essential comparison of income, poverty, etc. was between Crow Indians and all residents of Big Horn and Treasure counties. It would be more appropriate to present a comparison of Indian and non-Indian incomes, poverty, etc. If you did so (not counting the Indians twice), we think this would graphically illustrate why few of the new jobs would go to present non-Indian residents of the area.

6 - The appropriateness of the presentation of demographic data comparing Indians to non-Indians is relevent. However, the point to be made in the EIS is the disparity of income, and this was effectively analyzed utilizing the technique found in the EIS.

7. It is probable that, in addition to social and cultural pluralism, the mining operation will lead indirectly to political pluralism. Rather than the consensual style of decision-making usually present in a small town, political conflicts will increase in number and intensity. Traditional sources of authority, whether it be the tribal council or a socio-economic elite in a small town, will break down, and power will be diffused. The repercussions of this diffusion of power needs to be considered, we believe, in the final EIS. Another probable political impact of the mining operation will be a loss of local control over the political process. Traditional loyalties, whether to the tribe or the town, will break down, and other loyalties will take their place. It would be expected that as these transitions are made, the local people would tend to become increasingly alienated from their local governments and would feel, justifiably or not, less efficacious in their control over local governmental affairs.

7. The question of pluralism is important. Certain jurisdictional issues will almost certainly rise. However, these issues can be properly approached only by due process of law and must await certain determination by various branches of the legal community. This question has particular relevence to any development on the Crow Reservation and will be carefully studied in the larger programatic statement now underway.

8. (4) Responsibility for Enforcement - In general it appears that the various industrial interests, especially Westmoreland and Burlington Northern, are responsible for complying with the various requirements set forth in this proposal, with no provision made for external supervision. We do not believe this to be reasonable.

For instance, would it not be better to have an independent agency, rather than Burlington Northern, enforce the provisions of the railroad construction contract relevant to the minimization of environmental impact? (p. 135) With respect to the future discovery of significant historic and prehistoric sites during the mining operation, we do not believe that Westmoreland should be responsible for notifying the State Archeologist, because it is not in their interest to do so; perhaps Westmoreland could hire an independent archeologist to oversee this part of the operation. (p.136) With respect to assessing the effects of coal strip mining on wildlife species and their habitats, we do not believe that Westmoreland will do the kind of job necessary in gathering appropriate information and in monitoring the effects of their mining. They are in the mining business, not wildlife management. It seems possible that Westmoreland could appropriate monies to the state or federal government to pay for expert analysis of coal strip mining effects. In general, we do not believe that vested private interests should be expected to enforce impartially the regulations under which they operate. We have a number of shorter points.

9. (5) Future Developments - We believe you are legally bound to consider (1) the interactive effect of this development along with the other coal related developments in the region and (2) the effect of the reasonably anticipatible future development associated with this project. You do neither. You assert, on page 3, that future environmental statements will need to study the cumulative effects. To the extent that it is possible to do so, we believe you must do that in this document.

10. (6) Impact on Workers - We think there was an entirely inadequte discussion of the noise problem. Some of the decible levels you talk about seem damaging to employees and anything else nearby. The availability of precautionary measures is not sufficient.

11. (7) Impact on Hydraulic System - We think that there was insufficient attention in the draft impact statement to the prospect of damage to the coal bed aquifers - and particularly the depletion of ground water outside of the tracts under lease, with full coal development. It may be true (dubious), that "Regionally (outside of Tract III) the effect of the strip mining operation on ground water conditions in this aquifer will probably be moderate, unless the proposed mining area is expanded considerably." But every reasonable person knows that Westmoreland plans to expand the mining area "considerably."

12. (8) Mining Impact on the Topography - We do not believe you are correct in asserting (p. 158) "Only through an unreasonable expense and amount of effort could the land be put back into its original contours and conditions." Could you clarify what is considered to be an unreasonable expense for the total reclamation of the land? (p. 158). What would the expense be, and would Westmoreland be willing to consider whatever additional expenses necessary to accomplish the job? We do not necessarily believe that it is desirable to decrease the land surface gradient from the original, in that the land should have esthetic purpose as well as agricultural purpose.

13. (9) Crow Response to the Proposal - It seems vitally important that in the final EIS the Crow Indian leaders (p.199) consulted during the preparation of the statement be identified and their opinions stated. Also, we suggest that Crows opposed to the mining proposal be solicited for their opinions and their reasons for opposition. This might be considered an incursion into the authority of the Crow Tribal Council, but given the controversy of this proposal and the probable applications for similar leasing arrangements elsewhere on Indian lands in the future, and given the increasing interest in this topic to all Indians, we feel that it would be appropriate to set such a precedent.

(10) Now that the National Academy of Science report on strip mining in the west is available, we believe this proposal ought to be strictly evaluated in terms of those criteria in a revised draft environmental impact statement.

14. (11) In view of the fact that the U.S. Senate has passed an amendment to the strip mine control act, which forbids any strip mining on land where the surface is owned by private citizens, but the mineral rights are in federal ownership, we believe you should do nothing, and allow nothing, which would thwart that intent, pending House action and final passage of that federal legislation.

15. Finally, we have one question. You simply add the expected tribal royalties to present tribal income, to arrive at the expected economic benefits for the Crow. But will not the increased tribal income from coal leases (and salaries) reduce some of the other present income from the Crow, so that their net gain will be less than you assert? If so how much?

Thank you for your attention to our concerns. Should these comments arrive in time, would you please read them into the record at the public hearing, as well as including them and responding to them in the final EIS. We would be delighted, of course, if this proposal does not go to a final EIS in this form. You should, in honor, completely renegotiate and redo this effort.

Sincerely,

H. Paul Friesema
Sam Carnes

H. Paul Friesema
Sam Carnes
On behalf of the
Great Plains Communities Study Group

8. The enforcement issues raised are the responsibility of the state and federal agencies provided for under various statutes. The Montana legislature and enforcement agencies have effectively illustrated both their intent and control in regard to resource protection and conservation in strip mining activities.

9. The interactive effect of this development along with much larger scale mineral development and utilization proposals is being considered in the programatic statement now being made on the Crow Reservation and the Northern Great Plains Resource Plan.

10 - Text has been changed to list sources of regulations. An educational program will be conducted to be sure the workers understand the danger of high decibel noise levels.

11. Information presented in the E.I.S. on the hydrologic environment and the impact of strip mining thereon is deemed adequate for the level of development which will result from the 1280 acre Westmoreland Resources Mining Proposal. Additional information on the shallow ground water environment is presently being compiled by the Montana Bureau of Mines and Geology. Their findings and recommendations will be made available to the responsible parties involved, as well as the Montana Department of State Lands which has the responsibility for enforcing the provisions of the Montana Strip Mining and Reclamation Act. This Act provides for the recompense of landowners whose ground water supplies are subjected to contamination, dimmution, or interruption, proximately resulting from strip mining, if in fact this does occur.

12. Compliance with provisions of the Montana Strip Mining and Reclamation Act regarding reclamation of the mined lands will be made.

Topography will be similar to original, but the more severe slopes will be reduced to contribute to the success of reclamation.

13. The duly constituted tribal council entered the lease with Westmoreland Resources. The EIS team has been in nearly continual contact with tribal leaders during the entire assessment effort and has had tribal representation on the team. In the ongoing effort, two members of the Crow Tribe will be fulltime liason officers between the tribe and the EIS team.
Public hearings on November 6 and November 13 at Crow Agency gave the Crow Indian people opportunities for Indian discussion and participation.

14. The coal is Indian owned, not federally owned.

15 - Increased tribal income from coal leases and salaries are entirely additional to present income. The land proposed to be mined is off the reservation and not included in any ownership or income producing function of the tribe. Salaries paid by the mining company will probably be higher than some local employers pay which may cause a turnover as trained people move to higher paying jobs and others take over the local work.

NORTH DAKOTA STATE PLANNING DIVISION

STATE CAPITOL—FOURTH FLOOR—BISMARCK, NORTH DAKOTA 58501
701 224-2818

November 2, 1973

STATE INTERGOVERNMENTAL CLEARINGHOUSE "LETTER OF COMMENT"
ON PROJECT REVIEW IN CONFORMANCE WITH OMB CIRCULAR NO. A-95

To: USDI - Bureau of Indian Affairs

STATE CLEARINGHOUSE PROJECT NUMBER: 7310059286

Mr. Wayne E. Stephens, Director
Planning Support Group
USDI - Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

Subject: Draft EIS - Crow Ceded Area Coal Lease Westmoreland and Resources Mining Proposal. DES-73-59.

This Draft EIS was received in our office on October 5, 1973.

In the process of the A-95 review, the attached comment was received from the North Dakota Public Service Commission.

This document and attachment constitute the comment of the State Intergovernmental Clearinghouse, made in compliance with OMB Circular No. A-95.

Sincerely yours,

Bonnie E. Austin

Miss Bonnie E. Austin
Associate Planner

BEA/ds

I have asked the Reclamation Inspector, Dr. Edward J. Englerth, of the Public Service Commission to review the proposed environmental statement. It is one of the better environmental impact statements.

1. This is to be a coal mine and, hence, we would not get into transmission line questions, etc. However, we have several questions regarding reclaiming the land. Dr. Englerth is wondering if it may not be necessary to require grass for several years in order to stabilize the land prior to cropping it.

If we understand it correctly, the impact statement does say that the depth of the usable surface material can be increased if it seems to indicate that the high sodium spoil will be detrimental to establishing vegetation.

2. My guess is that it is going to be necessary to segregate soils and bring them back into the spoil pile in a manner somewhat similar to the way they were removed. Unless this is done, reclamation may not be possible.

3. This is a draft environmental statement and one huge question remains and that is who will finally insure that total reclamation is accomplished.

1. The reclamation program calls for the establishment of grass and trees (Page 141) these will be established and retained until other satisfactory use can be made of the lands.

2. Segregation of soils. Complete segregation would be extremely expensive, and probably not desirable; some mixture may give a more permeable, higher productive soil than the original. High sodium and other soils of low permeability would be separated and placed in the bottom of the pit, (this is covered on pages 158 and 159).

3 - Federal, State and tribal regulations must be complied with. Supervision will be by the U.S. Geological Survey, Bureau of Mines, BIA Land Operations and State Mining inspectors. The tribal lease contains a cancellation clause in case of non-compliance. Periodic inspections will be made by each agency.

NORTHERN PLAINS · RESOURCE COUNCIL
481 STAPLETON BUILDING
BILLINGS, MONTANA 59101
406 259-6114
LAND · WATER · AIR · PEOPLE

November 18, 1973

Mr. Wayne E. Stephens
Director, Planning Support Group
Bureau of Indian Affairs
Department of the Interior
Billings, Montana

Dear Mr. Stephens:

Enclosed please find our comments on the draft environmental impact statement on the Westmoreland Resources' mining proposal.

Sincerely,

Kit Muller

Kit Muller, Vice Chairman
Northern Plains Resource Council

Abstract of Northern Plains Resources Council

Introduction

A major concern of the Northern Plains Resource Council is that DES 73-59 will be precedent setting in three ways. (1) DES is the first EIS related to coal development in Northern Plains area, (2) the first EIS pertaining to the development of Indian coal and (3) the first EIS pertaining to the development of coal under the Montana Mining Act of 1973.

As precedent setting any decision made on the basis of this EIS will probably be indicative of the analysis and decisions of this proposal, and the other proposed development of Indian coal in the Northern Plains area. Therefore, DES 73-59 should meet all the requirements of the NEPA, State of Montana Mining Act of 1973, and other federal laws affecting the environment.

The council feels that OES 73-59 is inadequate and needs revising to meet these requirements, especially in three major areas which are: (1) Legal irregularities, (2) socio-economics and (3) consideration of alternatives.

1. Legal Irregularities

The council feels that BIA has not been impartial regarding the legal points, policy decisions, and their involvement in the proposal. They feel that BIA has not followed the procedures or requirements of the NEPA and 25 code of Federal Regulations 177 and 171. They claim that both of these laws require technical assessment prior to any substantive action. Since Westmoreland has been allowed to begin construction, and leases for prospecting and mining has been granted without an approved EIS, BIA is vulnerable to court action.

The council state that OES 73-59 does not discuss other legal actions such as water right options which were granted to Colorado Interstate Gas and Westmoreland. According to the council Westmoreland granted an option to CIG for 10,000 A/F of water per year, and Norsworthy and Reger has assigned its option for 30,000 A/F of water per year from the Crow Tribe to Westmoreland Resources.

The council charges that according to the requirements under NEPA all cumulative impacts of a potential operation be examined whereas DES 73-59 only cover an initial period of 5 years of Westmoreland mining operation, the EIS is in violation of the requirements of NEPA.

The council also feel that OES 73-59 does not consider the serious problem of mineral rights and mineral ownership. They feel that approval of the mining plan will jeopardize the rights of surface owners and split mineral estates which occurred through homestead patents and mineral patents.

Comments from NPRC were 60 pages in length thereby necessitating abstracting so it could be included in the Final Statement.

An abstract of the Northern Plains Resource Council's Comments was prepared to enable the task committee to respond to the major points of the comments. The abstract follows along with the responses. It appeared that the comments centered on three major concerns: (1) Legal irregularities, (2) social and economic irregularities, (3) alternatives.

The acceptance of the EIS on the Westmoreland development will not lessen the need for additional statements, meeting the NEPA and Montana Mining Act of 1973 requirements for future coal development within this area.

Impact statements are not designed to settle or even evaluate all real and imagined legal and jurisdictional conflicts.

Neither are they disposed to make any analyses beyond that implied by the factual information available. Should the mining plan be changed, further analyses would need to be made to re-evaluate the entire impact. For instance, if any major modification or expansion in coal extraction or utilization is planned, further assessments will be required.

1 - Legally it was proper for Westmoreland Resources to proceed with construction activities as borne out by the Attorney General of Montana on August 8, 1973. The substance of that opinion was that construction does not constitute strip mining as defined under the Montana Strip Mining and Reclamation Act.

Furthermore, prior to the reversal of Oavis vs. Morton in November of 1972, the federal courts held that NEPA did not apply to Indian lands. Therefore, U.S. Geological Survey approval of Westmoreland's mining plan (in accord with the terms of the lease) was the only action required of the federal government. The principal purpose of the U.S.G.S. responsibility was to prevent waste of the Crow coal resources. When Oavis vs. Morton was reversed, Westmoreland was financially and contractually committed. In March of 1973, the Bureau of Indian Affairs was assigned responsibility for EIS preparation, following a decision not to appeal Oavis vs. Morton.

DES 73-59 does not establish the jurisdictional relationship between BIA - State of Montana - U.S. Government. For example is WR has to comply with state laws, does this include tax laws?

2. Social-Economic Situation

The basic accusation pertaining to the socio-economic characteristics by the council is that DES 73-59 does not go into sufficient depth and the cummulative effect of expanded mining and energy conversion plants are not covered.

The DES 73-59 does not evaluate the impacts which had occurred from the start of the operation to the date of the publication. Also the council feels that DES does not identify and evaluate the nature and magnitude of potential impacts that will change over time.

The council feels that additional mining information is needed to assess social and economic impacts. They also feel that relevant and requisite data for predicting impacts is absent in the EIS.

In brief then the council feels that the EIS ignores the recommendations of the CEO, "to evaluate both long and short range implications of proposed actions to man, his physical and social surroundings, and to nature" and a shortcoming of the EIS is the absence of supporting data and adequate documentation of many assertions of negligible potential adverse social and economic effects.

3. Alternatives

DES 73-59 does not substantiate that the mining was designated with optimum return to the Crow Tribe, nor does it evaluate alternatives thoroughly enough with respect to this parameter. Also the alternative for the Crow Tribe to develop the mineral is omitted.

Since operations has already started, alternatives are less likely to be considered or initiated. The council states that the EIS has not properly considered alternatives in three general areas: (1) energy alternatives, (2) alternatives for the particular utilities and (3) development alternatives for the Crow Tribe.

DES 73-59 did not discuss re-negotiation of the lease with more income and employment preferential for the Crow Tribe. Non coal alternatives, for example; long range agriculture vs short term mining and other forms of industrial development was not discussed in the report.

The alternatives of other energy sources was not evaluated in the report. Statements in the report state other sources of energy are available but are not feasible but no documentation to support the statement, and alternatives for future use of coal are completely omitted in the EIS report.

2. Socio-Economics - The coverage of the socio-economic analyses in DES INT 73-59 is adequate to measure impact of 1280 acres of disturbed land yielding 77,000,000 tons of coal over 20 years. A greater extent of socio-economic analyses will be done for later studies involving higher levels of coal extraction.

Two studies are presently under way to study the effects of larger scale coal development: A programatic statement for the Crow Reservation proper; and the Northern Great Plains Resources Program study measuring the impact of large scale coal extraction and energy plants in the plains states.

Impact statements for specific coal development projects on the Crow Reservation will be prepared when the project plans become specific.

See response to Schwechten for more discussion of this point.

3. Alternatives - Crow Tribal development of the coal was not considered as an alternative. The lack of economic and technical resources available to the Crow Tribe excluded this an an alternative as indicated by the fact that the Crow Tribal Council determined for themselves that to sell the coal to Westmoreland was the best way to utilize their resource.

The decision to sell a part of their coal, in order to acquire funds for advancement of their people, was made with the knowledge of future use and value for other uses of part of the remainder. Spreading usage over a large period will enable the tribe to have a substantial economic base for future generations.

Renegotiation of the lease is not a concern of an environmental impact statement, but a matter between the lessee and lessor. They are taking care of this matter.

The long range agricultural use of this land could be enhanced through reclamation. Ongoing programs for industrial development have shown little progress in this area unless it is based on the availability of some natural resource. In the case of coal as a natural resource less adverse environmental impact will result by mining it and shipping it out as the Crows have chosen to do.

SARPY CREEK PROTECTIVE ASSN.

Hysham, Montana 59038

1st November 1973

COMMENTS AND CRITIQUE ON THE
DRAFT ENVIRONMENTAL STATEMENT
AS PREPARED BY THE BUREAU OF
INDIAN AFFAIRS, U.S. DEPARTMENT
OF THE INTERIOR, ENTITLED:
"CROW CEDED AREA COAL LEASE,
WESTMORELAND RESOURCES MINING
PROPOSAL"

Prepared by DONALD TOBKIN, Sec.

Some time ago I suggested that we should consider setting aside ona of the larger National Forests in America for the primary purpose of providing pulp for paper to publish Environmental Impact Statements and follow-up critiques and comments to same. This is to say that here is one more foray into the "paper war" that began with the enactment of the 1969 National Environmental Policy Act.

The BIA-sponsored review of the proposed coal strip-mining operation on the "Crow Ceded Area" contains several technical errors, but the aim of this critique is not to belabor these errors, for they will very likely be set right either by themselvee or by other interested parties. The primary thrust of this critique is to discuss the economics of said strip-mining operation. More specifically, to discuss the mediocrity, bias, and shortsightedness of the economic justification. A quote from page 165 of the statement sets the tone quite well for what is obviously the over-riding justification of the whole strip-mining proposal: "In considering any alternatives it must be borne in mind that the primary purpose of leasing this particular coal is to provide income and employment opportunities to the Crow Tribe."

It is most interesting to note that the Crow Nation has chosen to intervene on behalf of Westmoreland Resources in its defense against an environmental lawsuit filed last June by the Sierra Club and several other conservation-minded organizatione in the Northern Great Plains Region. This action by the Crow Nation coupled with quote above from the BIA statement reveals that both the white bureaucracy of the BIA and the Crow Nation are in apparent perfect agreement about the strip-mining proposal. The anxiousness of the white bureaucrats in the BIA is probably understandable, but..... as for the Crow Nation..... they've come a long ways since the time of their forefathers, and the contemporaries of their forefathers — contemporaries like a Blackfeet Tribal chief from the Milk River region of northern Montana who rejected a request by U.S. Government officials to put his signature to a land treaty: "Our land is more valuable than your money. It will last foraver. It will not even perish by the flames of fire. As long as the sun shines and the waters flow, this land will be here to give life to men and animals. We cannot sell the lives of men and animals; therefore we cannot sell this land. It was put here for us by the Great Spirit and we cannot sell it because it does not belong to us. You can count your money and burn it within the nod of a buffalo's head, but only the Great Spirit can count tha grains of sand and the blades of grass of these plains. As a present, we will give you anything we have that you can take with you; but the land, never."

The Indians have come a long way since the times and the values of their forefathers, 1973 finds them to be in apparent perfect agreement with the white bureaucrats of the BIA as to just how exploitable the land is and just how valuable cold cash is..... namely, money supercedes the value of anything else under the sun. And the easy money from strip-mining coal development supercedes all other sources of money. A quote from page 36 seems most out-of-place in view of the economic justification presented in the statement: "The culture of the people, both Indian and non-Indian, in the region ... is highly influanced by ganerations of living in close association with nature. It is the often exprassed opinion that, among both races, the local peopla have developed a way of life and a system of valuas, that reverea land, open space, and blue skies above economic and material acquisitions." Whatever might be the serious interpretation of this particular statement, it is completely ignored in the final conclusions of the environmental statement, the final conclusion being that it is okay to strip-mine the coal in the Sarpy Creek area.

a If one considers some statistics from the U.S. Bureau of Mines which contend that only 3% of our total coal reserves are obtainable by surface mining methods, then it becomes obvious that strip-mining is much more of a "land use" issue than it is an "energy" issue. In particular the land being used (...destroyed...???) in

1. this arbitrary method of energy production is land upon which neither the BIA nor the Crow Nation holds the surface estate. And further, it is land and landowners for which neither the BIA nor the Crow Nation can honestly be expected to hava any real concern for, except for the easy money they hope to pick up. Perhaps this is fair..... fair ~~that~~ in the sense that once upon a time the white man took this whole nation away from the Indian people, now the Indians are taking it away from the whites. It seems regrettable that the Indian people have let their valuas degenerate to the vulgar destructiveness and exploitation that has long dominated the value system of the invading white man. The whole human family upon this planet seems intent upon continued degeneration.

Thirty years or so from now when the ambitious strip-miners are done with their job, it is highly doubtful that either the white man or the Indian will have improved his real condition in life. Our problems will only continue to compound as they have already been doing for so long in history. Money and jobs have historically done very little to alleviata (excuse me, "mitigate") the true foundations of poverty, discrimination, exploitation, and economic injustice. America's problems with minority group unemployment, overcrowded urban living, inflation, balance of payments, welfare, elitist favoritism, etc., are not getting any better or any more simplified. A very popular word in certain parts of the BIA statement is "mitigate." And in the case of Sarpy

2. Creek coal development, money is the omnipotent catch-all that is supposed to be able to "mitigate" all the adverse consequences of strip-mining for coal. This is a little like saying that if one hammer won't get the job done, the obvious solution to the problem is to simply get a bigger hammer. The contention that money can mitigate the bad effects (of whatever you are doing) is a cop-out..... a convenient way to evade a difficult problem. The white man brought his cash- and money-oriented value system to this land over 300 years ago, and ever since then the social and economic and environmental condition of this land has become more and more beset with intractable problems. The high hopes of the BIA and the Crow Nation that the easy money from strip-mining coal development is going to solve their problems..... is a very sad delusion. The only lesson that history seems able to teach us is that it really teaches us nothing!

a - Statistics in a letter from the Secretary of Interior to Congress refutes this low percentage. The percentage of strippable coal in the Montana, Wyoming and Dakota area is considerably higher.

1. - Westmoreland has acquired surface rights in the area where mining will occur.

2. It is true that money will not mitigate everything. However, it will have a beneficial economic impact on the Crow people and allow them a greater degree of self-determination.

The BIA statement admits the existence of several critical un-
knowns relative to the strip-mining operation. Such as reclama-
tion and revegetation, groundwater discharge systems, noise pollu-
tion, dust dispersion, population distribution, magnitude of fu-
ture development, Pigs Eye Coal Terminal, adjacent surface rights,
etc. The potential for serious adverse consequences from some of
these unknowns far outweighs the short-term, superficial econom-
ic benefits that are over-rated and have over-infiltrated the
whole statement. One dimension of the economic argument that is
conveniently ignored in the statement is the people in the Ap-
palachian area who will be put out of work when western coal re-
3. places the eastern coal. Assume that some of the coal now be-
ing delivered to Westmoreland's future customers is coming from
deep mines in the Appalachian region. Further assume the factor
of 16 (reference page 169) to be accurate for deep-mine produc-
tion vis-a-vis strip-mine production. This means 125 new jobs
on Sarpy Creek, but maybe as many as 2,000 jobs lost in Appala-
chia. What about the 70 billion tons or more of deep-mine low
sulfur coal reserves in the Appalachian region? What of the
thousands of unemployed and experienced deep-miners in Appala-
chia? The management of Westmoreland Resources has made the
claim to me that they "have some moral obligation to the people
of the upper Mississippi Valley who are trying to achieve clean
air and comply with the Clean Air Act." But compliance with
the Clean Air Act may prove technically impossible in any case.
Consider that a represenative of a southern Minnesota electrical
utility told me that his experience with burning a sample of
4. western coal resulted in very little overall improvement in tot-
al stack emissions in light of the high-moisture/low BTU western
coal versus the low moisture/high BTU deep-mined eastern coal
(3% sulfur) that his utility has been burning regularly. There
might be two sides to the "moral obligation" proclaimed by the
management of Westmoreland Resources..... a "moral obligation"
to the many unemployed (and perhaps more to come) deep-miners
in Appalachia. Appalachian coal is not all that undesirable.
Certainly it is no secret that the electrical utilities are pass-
ing on their cost increases to their customers. If deep-mined
eastern coal costs more, then let the customer/consumer pay the
added costs if he thinks he needs the electricity that bad. It
would very likely still be cheaper in total social and environ-
mental costs than tearing up thousands of acres of virgin west-
ern rangeland and farmland to obtain less than 3% of our total low sulfur re-
serves.

put of coal nationwide has
eat shortage of coal miners.

4. Experience in use of western coals show lower SO_2 emissions.

Montana's economy is not presently in a state of total collapse
such that its only hope for revival is in large scale strip-min-
ing coal development. A quote from page 38 of the BIA statement
says: "If coal mining does not take place, the economy would not
likely change appreciably from that of today." And so be it.
Of further interest in this discussion on jobs and economics are
5. two news reports in the Hardin Herald for 25th October 1973.
One story is headlined, "Are sugar beets on the way back?" (to
the Hardin area). One former beet grower in discussing his hes-
itancy to go back into beets says, "There's not enough labor
around and there's quite a bit of expense going into it." He's
probably right about the labor problems. Westmoreland will get
the workers to produce coal for electricity, but the beet grow-
ers who would produce food to eat will have to go without the
workers. Perhaps they will decline to produce the food, we can
go to eating megawatts of electricity. A second news report dis-
cusses a three year study conducted by Montana State University
which concludes that, "Compared to 1971, Montana's agricultural
manpower needs will be up by seven percent next year in agri-
business and five percent for fulltime farm and ranch employees."
The economy of Montana and Big Horn County in particular, is not
in a state of total collapse, agricultural jobs offer an alterna-
tive to strip-mining coal development. And further, agriculture
promises to be around for a lot longer than the 30-35 years that
the coal developers are talking about.

5. This mining will give Indian persons a broader selection of job opportunities. This will broaden the area of self-determination in their lives.

But if the BIA's economic argument falls apart, what about the industry's "energy crisis" argument? One small instance (among millions) that empties out that argument is the standby (ie. not in regular service) railroad engine unit that sits on a siding about halfway up the newly-constructed Sarpy Creek spur..... it just sits there with engines running 24 hours a day/7 days a week..... a 100% waste of energy and fuel resources. America is a nation which comprises only 6% of the world's population, but we are consuming 35% of the world's natural resources. We do not have an "energy crisis," we have a crisis of insanity in over-consumption and waste and greed. The solution to our energy crisis is not in strip-mining more virgin lands and building more power plants and gasification plants and oil shale plants and tar sands plants and power lines and oil pipelines and gas pipelines and refineries and supertankers and railroads and hydroelectric dams and getting the whole nation ulcered up with worry over the stability of our foreign supplies of crude oil..... the solution is to tone down our over-consumption and waste and greed.

Sarpy Creek coal development by strip-mining boils down to be an opportunistic and expedient maneuver by an elite few to arbitrarily impose something that will prove predominately destructive and increasingly problematic over the long-term. The BIA statement may be adequate in its treatment of the superficial and the short-term considerations of the Westmoreland strip-mining proposal, but its unfortunate mediocrity precludes hardly more than cursory treatment of the more long-term and discomforting type questions.

And lest America needs to commit a second National Forest to the environmental paper war, I will terminate my remarks by urging the BIA to set a five year moratorium on coal development . We need time to carefully search through lots of very critical and unresolved questions..... questions that not only relate to strip-mining on Sarpy Creek, but to the whole nation and to a developing national policy on energy conversion and consumption. We have nothing to lose by taking a five year "breather" to try and put this whole business together..... if indeed it can be put together.

Thank you for your time.

Donald Tobkin
DONALD TOBKIN

Hardin Chamber of Commerce

P. O. Box 450 Hardin, Montana 59034

November 6, 1973

Mr. Wayne Stephens
Federal Bldg.
Billings, Montana

Dear Sir:

The enclosure is a statement for the record that was read at the public hearing in Crow Agency, Montana held at Sun Lodge. This refers to the Drafe Evvironmental Statement DES-73-59 Crow Ceded Area Coal Lease Westmoreland Resources Mining Proposal.

Sincerely,

Leona Hodgson

Leona Hodgson
Exec. Secy.
Hardin Chamber of Commerce

Enc

The Hardin Chamber of Commerce is appearing here today for the purpose of making a statement as to the economic impact of the development of coal mining in Big Horn County; Hardin being recognized as the financial and political growth center of this area.

Although this hearing is concerned with the future development of valuable econominc resources, there has already been established a history of economic growth and developmemt attrituable to the pre-development of the westmoreland mine.

No response required.

We, as a Chamber of Commerce, find it incumbent upon us to acknowledge some of the important economic factors that have accrued since 1971.

1. Housing development for approximately 80 families directly associated with mine development.
2. Housing for an additional 30 families concerned with providing foods and services to the new popluation.
3. Employment for established area residents in construction of railroad, coal storage facilitiies, erection of the stripping shovel, clear cutting for and erection of the power line, providing a payroll of approximately $90,000.00 per week at it's peak.
4. The goods and services supplied by local retail business to the operating company and it's sub-contractors has been tens of thousands of dollars.
5. Personel associated with the mining development have involved themselves in the civic, religious and fraternal activities of this area and are providing leadership in these groups as well.
6. The additional homes and personal property of mining personnel in addition to the physical mining development have increased the taxable evaluation by $1,775,000.00. Therefore, this mining activity, through real and personal property taxes will pay for the additional public services required by their existence.
7. The most significant local aspect of this development is the income from coal royalties to be paid to the Crow Tribe of Indians, increasing the income of those citizens of the area who now have a per capita income substantially below the national average.

In conclusion, we would like to state that we support wholehaearedly, subject to the adequate enforcement of the laws of the State of Montana, the orderly development of coal resources as proposed by the Westmoreland group. We feel it is essential to our immediate economic viability as well as contributing to the energy needs of the nation.

Dr. Willard R. Anderson
Superintendent

PRINCIPALS
LARRAE ROCHELEAU
LUKE DYCHE
GORDON HALVERSON
FLORENCE HANSON
ROY MARTINSEN
JAY McCALLUM

Marjorie MacClean
District Clerk

Hardin Public Schools

ELEMENTARY DISTRICT NO. 17-H — HIGH SCHOOL DISTRICT NO. 1
BIG HORN COUNTY
HARDIN, MONTANA
59034

BOARD OF TRUSTEES
DON BEARY, Ch.
ED JACOBSON, Vice Ch.
DR. MICHAEL DOWNING
REINHOLD JABS
EDYTHE McCLEARY
ROY NAYEMATSU

November 20, 1973

Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th St.
Billings, Montana 59101

Dear Mr. Stephens:

Mr. Ralph Moore, of Westmoreland Resources, has requested that I make available to you whatever information I have relating to student enrollment growth in District 1 & 17-H schools.

Enclosed are four charts:

Chart #1 - Shows District enrollments from 1967 to 1974.

Chart #2 - Shows a projected growth of 3% per year over 1973-74 enrollments for grades K-9, with no increase in grades 10-12. Anticipated dropouts would eliminate an increase of 3% or less in gradea 10-12.

Chart #3 - Shows a no-growth projection without any dropout factor at grades 10-12.

Chart #4 - Shows a no-growth projection with our present dropout factor applied for grades 10-12.

I believe Chart #2 would be a fairly close projection based on what has happened the past two years, and assuming a stable growth pattern has been established. However, I see no established growth pattern unless companies such as Westmoreland continue to construct and expand mining operations. The present level of operation does not appear to warrant any extensive enrollment projection.

No response required.

Another factor, which tends to modify school growth, is the rapid decrease in birthrate since 1970. This factor is already apparent in the lower grades and will soon be felt in the Junior High School and High School.

Our immediate concern in District 17-H is, perhaps not so much what will happen, but what has already happened. High birthrates in the sixties have peaked, along with the impact growth of local industry. Facilities which were near capacity and partially inadequate five years ago, are now beyond the point of meeting acceptable standards for developing a basic curriculum for the children already enrolled.

In summary, I would say that the present impact has partially been responsible for the crowded conditiona which now exist at the Hardin Junior High School and at Crow Agency Elementary. The continued operation of major industry in the District will make it imperative that a major building or remodeling program be initiated immediately to expand facilities at the above schools. If these facilities were designed to accommodate our immediate peak load, I would estimate that the decreasing birthrate would eventually counteract any future impact growth directly related to the present level of mining operation.

Sincerely,

W.R. Anderson

W. R. Anderson
Superintendent of Schools

WRA:hc
Encl.

Hardin School District 1 & 17-H

Chart #1

OCTOBER 1 ENROLLMENTS

GRADE	K	1	2	3	4	5	6	TOTAL	SP. ED.	7	8	9	TOTAL	SP. ED.	10	11	12	TOTAL	GRAD	DISTRICT TOTAL
1967 – 1968		191	156	125	145	130	127	901	27	123	137	112	372		120	90	101	311	101	1584
1968 - 1969	73	185	134	159	129	146	123	973	24	147	131	156	434		108	114	94	316	87	1723
1969 – 1970	76	197	161	133	164	136	141	1037	29	138	149	129	416		138	107	105	350	103	1803
1970 - 1971	74	185	152	152	147	151	137	1032	44	136	140	137	413	22	110	116	90	338	82	1783
1971 - 1972	61	179	152	137	142	135	152	979	21	137	136	119	394	12	117	101	116	346	106	1719
1972 - 1973	98	153	140	143	133	140	134	968	27	142	134	127	403	8	104	113	92	317	88	1688
1973 - 1974	110	120	132	124	147	136	144	946	33	158	153	137	448	12	125	101	106	344		1738

Hardin School District 1 & 17-H - November 19, 1973

Chart #2

OCTOBER 1 ENROLLMENTS WITH A PROJECTED 3% GROWTH OVER 1973-74 FIGURES - GRADES K-9

GRADE	K	1	2	3	4	5	6	Sp Ed	TOTAL	7	8	9	TOTAL	10	11	12	Sp Ed	TOTAL	GRAD	DISTRICT TOTAL
1967-1968		191	156	125	145	130	127	27	901	123	137	112	372	120	90	101		311	101	1584
1968-1969	73	185	134	159	129	146	123	24	973	147	131	156	434	108	114	94		316	87	1723
1969-1970	76	197	161	133	164	136	141	29	1037	138	149	129	416	138	107	105		350	103	1803
1970-1971	74	185	152	152	147	151	137	44	1032	136	140	137	413	110	116	90	22	338	82	1783
1971-1972	61	179	152	137	142	135	152	21	979	137	136	119	394	117	101	116	12	346	106	1719
1972-1973	98	153	140	143	133	140	134	27	968	142	134	127	403	104	113	92	8	317	88	1688
1973-1974	110	120	132	124	147	136	144	33	946	158	153	137	448	125	101	106	12	344		1738
•1974-1975	113	123	124	136	128	151	140	34	939	148	162	158	468	137	125	101	13	376		1783
•1975-1976	116	126	126	128	140	132	155	35	958	144	152	167	463	158	137	125	14	434		1855
•1976-1977	119	129	129	129	132	144	136	36	954	159	148	156	463	167	158	137	15	477		1894
•1977-1978	122	132	132	132	132	136	148	37	971	140	163	152	455	156	167	158	16	497		1923
•1978-1979	125	135	135	135	135	135	140	38	978	152	144	167	463	152	156	167	17	492		1912
•1979-1980	128	138	138	138	138	138	138	39	995	144	156	148	448	167	152	156	18	493		1936
•1980-1981	131	141	141	141	141	141	141	40	1017	141	148	160	449	148	167	152	19	486		1952
•1981-1982	134	144	144	144	144	144	144	41	1039	144	144	152	440	160	148	167	20	495		1974
•1982-1983	137	147	147	147	147	147	147	42	1061	147	147	147	441	152	160	148	21	481		1983
•1983-1984	140	150	150	150	150	150	150	43	1083	150	150	150	450	147	152	160	22	481		2014
•1984-1985	143	153	153	153	153	153	153	44	1105	153	153	153	459	150	147	152	23	472		2036
# ESTIMATED 3% GROWTH	•	•	•	•	•	•	•			•	•	•		(NO ESTIMATED GROWTH) (AFTER GRADE 9)						

Hardin School District 1 & 17-H

Chart #3

OCTOBER 1 ENROLLMENTS WITH NO PROJECTED GROWTH

GRADE	K	1	2	3	4	5	6	TOTAL	SP. ED.	7	8	9	TOTAL	SP. ED.	10	11	12	TOTAL	GRAD.	DISTRICT TOTAL
1967 – 1968		191	156	125	145	130	127	901	27	123	137	112	372		120	90	101	311	101	1584
1968 - 1969	73	185	134	159	129	146	123	973	24	147	131	156	434		108	114	94	316	87	1723
1969 – 1970	76	197	161	133	164	136	141	1037	29	138	149	129	416		138	107	105	350	103	1803
1970 - 1971	74	185	152	152	147	151	137	1032	44	136	140	137	413	22	110	116	90	338	82	1783
1971 - 1972	61	179	152	137	142	135	152	979	21	137	136	119	394	12	117	101	116	346	106	1719
1972 - 1973	98	153	140	143	133	140	134	968	27	142	134	127	403	8	104	113	92	317	88	1688
1973 - 1974	110	120	132	124	147	136	144	946	33	158	153	137	448	12	125	101	106	344		1738
*1974 - 1975	110	120	120	132	124	147	136	922	33	144	158	153	455	12	137	125	101	375		1752
*1975 - 1976	110	120	120	120	132	124	147	906	33	136	144	158	438	12	153	137	125	427		1771
*1976 - 1977	110	120	120	120	120	132	127	882	33	147	136	144	427	12	158	153	137	460		1769
*1977 - 1978	110	120	120	120	120	120	132	875	33	124	147	136	407	12	144	158	153	467		1749
*1978 - 1979	110	120	120	120	120	120	120	863	33	132	124	147	403	12	136	144	158	450		1716
*1979 - 1980								863	33	120	132	124	376	12	147	136	144	439		1678
*1980 - 1981								863	33	120	120	132	372	12	124	147	136	419		1654
*1981 - 1982								863	33	120	120	120	360	12	132	124	147	415		1638
*1982 - 1983								863					360	12	120	132	124	388		1611
*1983 - 1984								863					360	12	120	120	132	384		1607
*1984 - 1985								863					360	12	120	120	120	372		1595
PROJECTED * NO GROWTH																				

Hardin School District 1 & 17-H

Chart #4

OCTOBER 1 ENROLLMENTS WITH NO PROJECTED GROWTH AND BASED ON AVERAGE DROPOUT FIGURES

GRADE	K	1	2	3	4	5	6	TOTAL	SP. ED.	7	8	9	TOTAL	SP. ED.	10	11	12	TOTAL	GRAD.	DISTRICT TOTAL
1967 – 1968		191	156	125	145	130	127	901	27	123	137	112	372		120	90	101	311	101	1584
1968 - 1969	73	185	134	159	129	146	123	973	24	147	131	156	434		108	114	94	316	87	1723
1969 – 1970	76	197	161	133	164	136	141	1037	29	138	149	129	416		138	107	105	350	103	1803
1970 - 1971	74	185	152	152	147	151	137	1032	44	136	140	137	413	22	110	116	90	338	82	1783
1971 - 1972	61	179	152	137	142	135	152	979	21	137	136	119	394	12	117	101	116	346	106	1719
1972 - 1973	98	153	140	143	133	140	134	968	27	142	134	127	403	8	104	113	92	317	88	1688
1973 - 1974	110	120	132	124	147	136	144	946	33	158	153	137	448	12	125	101	106	344		1738
1974 - 1975								922					455		-14	-11	-5	345		1722
1975 - 1976								906					438		-14	-11	-5	397		1741
1976 - 1977								882					427		-14	-11	-5	430		1739
1977 - 1978								875					407		-14	-11	-5	437		1719
1978 - 1979								863					403		-14	-11	-5	420		1686
1979 - 1980								863					376		-14	-11	-5	409		1648
1980 - 1981								863					372		-14	-11	-5	389		1624
1981 - 1982								863					360		-14	-11	-5	385		1608
1982 - 1983								863					360		-14	-11	-5	358		1581
1983 - 1984								863					360		-14	-11	-5	354		1577
1984 - 1985								863					360		-14	-11	-5	342		1565
PROJECTED NO GROWTH										NO	LOSS				LOSS -		30			

HARDIN School DISTRICT 17-H

CHART 5

CROW School ENROLLMENT PROJECTED AT 3% PER YEAR OVER 1973-74

GRADE	K	1	2	3	4	5	6	TOTAL	SP. ED.	7	8	9	TOTAL	SP. ED.	10	11	12	TOTAL	GRAD.	DISTRICT TOTAL
1967-68		52	38	29	42	30	23		7	25			246							1584
1968-69		45	31	40	28	45	30		10	23			252							1723
1969-70		63	32	35	40	28	38		13	30			279							1803
1970-71		64	45	37	36	40	32		9	31			294							1783
1971-72		65	45	34	28	35	34		9				250							1719
1972-73	35	59	41	39	35	29	40		11				289							1688
1973-74	28	39	46	34	36	37	31		14				265							1738
1974-75													273							
1975-76													281							
1976-77													289							
1977-78													297							
1978-79													305							
1979-80													313							
1980-81													321							
1981-82													329							
1982-83													337							
1983-84													345							
1984-85													353							

HARDIN School DISTRICT 17 H

CHART 6

HARDIN ELEMENTARY ENROLLMENT PROJECTED AT 3% OVER 1973-1974

GRADE	K	1	2	3	4	5	6	TOTAL	SP. ED.	7	8	9	TOTAL	SP. ED.	10	11	12	TOTAL	GRAD.	DISTRICT TOTAL
1967-1968	–	122	106	83	86	88	89	594	20											
1968-1969	73	120	90	103	86	85	83	654	14											
1969-1970	76	117	112	89	110	94	92	706	16											
1970-1971	74	106	97	101	105	94	90	692	25											
1971-1972	61	102	91	93	102	93	101	655	12											
1972-1973	56	85	86	94	89	97	91	614	16											
1973-1974	74	71	81	80	102	91	101	619	19											
1974-1975								637												
1975-1976								655												
1976-1977								673												
1977-1978								691												
1978-1979								709												
1979-1980								727												
1980-1981								745												
1981-1982								763												
1982-1983								781												
1983-1984								799												
1984-1985								817												

STATE OF IOWA

Office for Planning and Programming

523 East 12th Street, Des Moines, Iowa 50319 Telephone 515 281-5974

ROBERT O. RAY
Governor

ROBERT F. TYSON
Director

November 21, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
U.S. Department of the Interior
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

The Iowa State Clearinghouse has administered a review on the Draft Environmental Statement for the Crow Ceded Area Coal Lease Westmoreland Resources Mining Proposal in Southeastern Montana. As we have found no objection to your statement, we find no reason to comment at this time.

No response required.

Thank you for having forwarded this statement to us.

Sincerely,

A. Thomas Wallace, Jr.
Federal Funds Coordinator

ATW:sf

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

L. P. Voigt
Secretary

BOX 450
MADISON, WISCONSIN 53701

November 20, 1973

IN REPLY REFER TO: 1600

Mr. Wayne E. Stephens, Director
Planning Support Group
U. S. Department of the Interior
316 North 26th Street
Billings, Montana 59101

Dear Mr. Stephens:

We have completed our review of the draft environmental impact statement for the Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal, prepared pursuant to Section 102 (2)(c) of the National Environmental Policy Act of 1969.

While the proposed project will have no direct affect on the environmental quality of the State of Wisconsin, coal from the mine supplied to Wisconsin power plants will result in secondary impacts on air quality. The overall effects of consuming Westmoreland coal at locations in Wisconsin, however, cannot be evaluated at this time. The environmental affects of coal consumption are analyzed on a project to project basis and the sulphur and ash content of the coal is not the criteria which must conform to Wisconsin standards. Rather, the pollutant emissions and ambient air quality are the enforcement criteris.

No response required.

We will look forward to receiving a copy of the final environmental impact statement for this project. Thank you for the opportunity to review and comment on this draft environmental impact statement.

Very truly yours,
Bureau of Environmental

C D Besadny

C. D. Besadny
Director

cc: Brooks Becker
Jerry McKersie
Lewis Posekany
Howard Druckenmiller

THIS IS 100% RECYCLED PAPER

November 15, 1973

Director - Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Re: DES 73-59

Dear Sir:

I am the owner-operator of a ranch on the East Fork of Sarpy Creek in Big Horn County, Montana, one thousand-plus acres of which are in Westmoreland Tract III. I want to register my opposition to the issuance of a mining permit to Westmoreland based on the selective denial provision of 1973 S.B. 94, "The Montana Strip Mining and Reclamation Act" of 1973. Section 9, paragraph 2, very well covers the reasons why a permit should be denied.

The land to be mined is exceptional by Montana standards with regard to agricultural productivity, scenic beauty, recreation, big game hunting and the present clean and healthy environment. This is in direct contrast to statements in the DES 73-59 which creates a poor image as to the productivity of the land involved.

There is no assurance that Montana land can be successfully reclaimed to a condition even close to that which it is prior to stripping. Maybe we would have a good tax base for the twenty or thirty years of mining but for the next twenty or thirty centuries after that the tax base would be nil when it becomes obvious that economically productive land is not possible or feasible from the present technology of reclamation. The myth of reclamation should be obvious from its non-existence.

There have been many bland statements by coal people to the effect that they feel confident as to the results of their efforts of reclamation. Even if they are sincere in their beliefs, this is not enough to satisfy SB 94. There must be proof positive that strip mined land can again be economically productive to a degree equal to that prior to stripping. The very fact that this has never been done before should be evidence enough that the declared policy of this state and its people will be violated.

I am amazed that the State Land Board has not already denied the permit based on the destruction of both surface and ground water as forecast by the DES 73-59.

Senator Mike Mansfield wrote in his letter to the House of Representatives urging consideration of S. 425, as amended: "First of all, I am convinced that the surface owner is in need of additional protection. Historically, the development of minerals has not created any serious problem for the surface owners. At the time when the United States allowed a severance of the mineral estate from the land estate in its patents to the public domain, surface mining which could utterly destroy the surface per se was not within the contemplation of the parties. Land restoration is still a matter of considerable debate. The situation we face today is considerably different than when our laws were applying to deep, hard rock mining." (October 10, 1973). (Emphasis supplied).

1. I am greatly concerned about the rest of my land not in Tract III. What is the economic productivity of land with the surface intact but with no water? What about the thousands of other acres besides mine? What will happen to the tax base of land without water?

1. See response to Dorothy V. Cady's comments regarding water. Page 48

Peabody Coal has recently admitted, in effect, their failure to adequately reclaim land with their request to make a lake out of a strip mine and their experience with alkaline-saline conditions. There is no reason to expect different results from Westmoreland.

I get the definite impression from the DES 73-59 of an intentional effort to create a rosy glow of monetary benefit out of a desolate, arid and marginal land. This rosy glow of affluence amounts to about 37¢/day and employment for approximately 50-60 Crow Indians. The bulk of the loot goes to a corporation, the parent corporations of which are all out of state. The few pages of DES 73-59 devoted to the disastrous effects of strip mining are vague and are stated in a manner to minimize concern.

I feel that DES 73-59 is inadequate, incomplete, inaccurate, biased, improper in its emphasis, and in conflict with our new State Constitution and the Montana Strip Mining and Reclamation Act.

I have heard concern from some uninformed people and some state officials about all the money already spent for railroad spurs, mining equipment and surface land acquisitions. It almost appears that Westmoreland et al. were encouraged to do so even without a permit. If there was any doubt in their mind about securing a permit, would they have done the same? If I somehow acquired 1,000 head of cattle and then went to the BIA, BLM, or any private land owner and said, "Look, I need your grass land to pasture these 1,000 cattle right now." Would the fact that I spent money to acquire 1,000 cattle have any bearing on my right to acquire the land? Absolutely not.

The law of Montana, S.B. 94, is very specific about preserving our land for future inhabitants. The will of the people put this law on the books and I feel confident the will of the people will help to enforce it. If the state officials charged with enforcing SB 94 are lax in enforcement they should be charged with malfeasance and removed from office.

It is stated in DES 73-59 that the rejection of a mining permit for environmental reasons would deprive the Crow tribe of royalty income and deprive the power plants of coal. Not stated is the fact that the surface owner will not receive anything either; but, isn't this exactly what the law, S.B. 94, is for? Are the Crow and the coal camapnies above the law of the state of Montana?

If the Crow want to relieve themselves, financially speaking, let them foul their own bed, not mine. Let them strip their own surface if it can be done according to state law.

2. It is stated in DES 73-59 that the lessor (Crow) reserves rights to oil, gas, sand, gravel, timber and building stone encountered in Tract III. The only reservation made by the United States was for coal. There are traces of my minerals in this coal and between the surface and coal and I do not want them disturbed. The same situation existed in William Shakespeare's "The Merchant of Venice". Take a pound of flesh, but do not spill one drop of blood. Can this be done? Absolutely not, legally.

2. Text has been changed.

Thank you for the opportunity to express my thoughts.

Bruce M. Cody

cc: Thomas L. Judge, Governor
Bill Christiansen, Lt. Governor
Frank Murray, Secretary of State
Robert L. Woodahl, Attorney General
Dolores Colburg, Superintendent of Public Instruction
Ted Schwinden, Commissioner of State Lands

November 15, 1973

Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th
Billings, Montana 59101

Dear Sir:

The following critique of the Draft Environmental Statement, Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal, will attempt to correct and clarify only a few of the inaccuracies found in the statement. Without technical assistance, it is impossible to know all of the errors that appear.

The Impact Statement attempts to diminish the effect of the mining, and to degrade the quality of the land in its present state.

OWNERSHIP

1. There are three estates in the Sarpy Creek area: the surface, minerals, and coal. The minerals are with the surface and only the coal ownership is in question. However, on page 49 of the Impact Statement it is noted: "Although they (Westmoreland) have mineral rights on the entire tract . . ."; and on page 118: "In any event, the lease contains a clause which reserves to the lessor (tribe) the rights to recover any oil, gas, sand, gravel, and building stone discovered . . ."

It appears that the tribe and Westmoreland have attempted to assume ownership of the mineral interest by simply ignoring the fact that the landowner has that interest.

The acts cited on pages 4 and 5 which purport to show ownership of the coal in the tribe do not do so. It is our opinion that a determination must be made as to the ownership of the coal.

1. Text changed

Comments with respect to the minerals other than coal question the ownership of these minerals. The ownership of the greater part of the minerals other than coal is not in the Crow Tribe; however, as the statement indicates, at this time there are no known minerals of commercial value except coal. Where the Tribe does own the mineral rights other than coal, the lease reserves to the Tribe the recovery rights.

PRECIPITATION

2. On page 34 of the Impact Statement, precipitation figures are shown for the area surrounding Sarpy Creek which tend to minimize the actual precipitation for the area as shown on the attached U.S. Department of Agriculture SCS study which shows precipitation to be from 15-19" annually. The Sarpy Creek area is favored with precipitation which just does not occur in the surrounding area.

2. This is based on weather bureau data. If more precipitation is received, it will help reclamation.

CATTLE PRODUCTION

On page 49, an estimate of 3.5 acres per animal unit per month, or about 42.0 acres per animal unit per year, is used to determine the number of cattle produced in Tract III. Attached is copy of Department of Agriculture SCS study on lands owned by the undersigned which shows our land to be capable of running one animal unit to less than 20 acres per year. The Impact Statement says "approximately 344 calves would be produced." According to the SCS study, we can produce approximately 30% of the total estimated calves on a little more than 12% of the land in Tract III. In other words, Tract III is capable of and probably does produce about 850 calves for a gross income of $153,000.

SOILS

3. Page 52 of the Impact Statement is a map showing land capability classes. The blue area supposedly has severe limitations. However, a large percentage of the hay for winter feeding is grown on that area and the yield is high. Our largest alfalfa and mixed hay field is in section 19. Our ranch is on the east fork of Sarpy Creek and is partially subirrigated. A 1962 SCS study of types of soils is attached.

3. Text changed - see also responses to Ed Dobson and John Redding comments at hearing.

CROPS

We farm only feed grain sufficient for our own use, and hay. We planted fifty acres of oats with yields of up to eighty bushels per acre four years ago, and have not needed additional grain.

WATER

4. The availability of water is the key to the exceptional productivity of the Sarpy Area. Page vi says "(d) Ground water will be diverted from coal seam aquifers, causing a reduction in the potentiometric surface."

The USGS Environmental Analysis says, "All wells or springs that exist in the mined area will be destroyed in the mining operation . . . "

On page 17 of the Impact Statement: "The seams to be mined contain less than one percent sulphur, and water now emanating from the lower seam is alkaline."

On page 194 of the Impact Statement, this: "Depletion and curtailment of use from these shallow ground water sources may be remedied, at additional cost to the user, through utilization of other sources available at greater depth."

Page 196: "Quality of shallow ground water supplies should not be adversely affected, although some seepage of leachate through the spoil bank material to the potentiometric surfaces of the coal bed aquifers may occur."

We are extremely concerned about the damage to the water source and water quality. We presently have year-around stock water from springs, and subirrigated meadows that will be destroyed.

4. Shallow ground water supplies for lands bordering on but not contained within Tract III will not be appreciably affected by coal strip mining operations. The probable area of influence (area within which measurable reductions in the aquifer potentiometric surface occurs) of strip mining on shallow ground water supplies should not exceed several hundred to several thousand feet from the perimeter of the mining pit. Maximum reduction in the potentiometric surface would occur at the face of the open mining pit. Outward from the open pit face, the potentiometric surface reduction would rapidly diminish due to the limited ability of these shallow aquifers to transmit water rapidly. Upon completion of mining and reclamation of the area, a partial restoration of the potentiometric surface, approaching its former level, will occur over a period of time. A more accurate estimate of these effects cannot be given without additional information on aquifer characteristics in the immediate area. This data should be available during the spring of 1974. These studies are presently being conducted by the Montana Bureau of Mines and Geology. Monitoring of ground water quality during the project life will also be conducted by this agency.

The Montana Strip Mining and Reclamation Act holds the lessee (mining operator) responsible for contamination, dimmution or interruption of a water supply, proximately resulting from strip mining. Therefore, recourse is available to an injured party to obtain compensation for a water supply that is damaged or destroyed.

RECLAMATION

There are at least two instances in the state where coal companies have admitted problems in the area of reclamation:

Decker Coal Co. has a problem near the Wyoming border with saline-alkali soils and it is yet to be proved that adaptable plant species exist or can be used for revegetation. They request that recreational ponds be permitted as an alternative to reclamation.

Peabody Coal Co. has requested permission to leave a lake instead of reclaiming the land.

Montana does not need a series of sour-water lakes. There has not yet been an example in the state or in the nation that reclamation has been successful.

Each mining area has unique and distinct characteristics; therefore, making reclamation potentials vary considerably from one location to another.

5. The Montana strip mining law is clear as to what constitutes reclamation, see Secs. 50-1044 and 50-1045, R.C.M. (1947).

5. Provisions for handling reclamation are discussed on pages 139 to 143 of the statement.

REQUEST FOR DENIAL

We have claim to the water rights but the Impact Statement makes no provision for their protection. Instead they say, "Go drill a deeper well". It is up to the Department to protect our water by refusing to grant the permit to mine. See Sec. 50-1055 (3), R.C.M. (1947).

We also respectfully request refusal of this permit to mine on the basis of Secs. 50-1042 (1), (2) (a), (b), (c) and (3), R.C.M. (1947), under the selective denial provision.

There is no way strip mining can be allowed in the Sarpy Creek area in compliance with Montana law.

Sincerely,

Dorothy V. Cady

cc: Governor Thomas L. Judge
Lt. Governor Bill Christiansen
Attorney General Robert L. Woodahl
Secretary of State Frank Murray
Superintendent of Public Instruction Dolores Colburg
Commissioner of State Land Ted Schwinden

LEGEND FOR RANGE SITES

Range sites are kinds of range land that differ from each other in their ability to produce a significantly different kind or amount of original vegetation. Current vegetative cover is indicated by the Range Condition Class. Only natural grasslands can be classified as range sites.
A soil group name is combined with the precipitation belt to designate a specific range site; e.g. Sandy 10-14".
The following range sites are listed in presumed order of natural productivity in "Excellent" condition.

Names of range sites occurring on your ranch are underlined. Precipitation Zone 15-19"

Range Site Descriptions:

WL - WET LAND: Marshy lands with subirrigation where seepage, ponding, etc. raises water table to above the surface during only a part of the growing season. Too wet for cultivated crops but too dry for common reed, cattails, or true aquatics.

Sb - SUBIRRIGATED: Lands with water table rarely above the surface during the growing season but subirrigated most of the growing season.

SS - SALINE SUBIRRIGATED: Subirrigated land where salt and/or alkali accumulations are apparent and halophytes occur over a major part of the area.

Ov - OVERFLOW: Areas regularly receiving more than normal soil moisture because of run-in from higher land, including stream overflow, run-in from higher slopes, and areas with water spreading systems.

SO - SALINE OVERFLOW: Areas regularly receiving more than normal soil moisture because of run-in, where salt and/or alkali accumulations are apparent and halophytes occur over a major part of the area.

Sa - SANDS: Deep, loose, fine sands and very fine sands on nearly level to rolling relief; excepting compact dark nearly level loamy fine sands and loamy very fine sands.

Sv - SAVANNAH: Uplands on which grass cover with isolated trees is normal (climax). Do not confound with savannah type of cover resulting from overgrazing of natural grassland or cutting of natural forest land. This site is common at margins of forest climates and in grassland climates where soil moisture relations especially favor tree growth.

Sy - SANDY: All normal coarse to fine sandy loams (not true sands) plus dark nearly level loamy fine sands, and loamy very fine sands; excepting relatively impervious cemented sands.

Si - SILTY: All normal very fine sandy loams, loams, silt loams, and silts.

Cy - CLAYEY: All normal relatively pervious sandy to silty clay loams and clays--normally granular.

TSy - THIN SANDY: Thin but deep sandy soils--not true sands--usually of hills with smooth surfaced slopes generally over 20% but also of lesser slopes where cementing occurs in upper layers on drying.

TSi - THIN SILTY: Thin but deep silty soils of hills with smooth surfaced slopes generally over 15%.

TCy - THIN CLAYEY: Thin but deep clayey soils of hills with smooth surfaced slopes generally over 15%.

SwC - SHALLOW CLAY: Shallow normally granular clays of hills (10-20") often underlain by angular raw shale fragments.

SwG - SHALLOW TO GRAVEL: Shallow soils (10-20") resting on clean gravelly or cobbly materials.

SwL - SHALLOW LIMY: Shallow limy soils (10-20") underlain by rock virtually impenetrable by plant roots.

SwN - SHALLOW NONLIMY: Shallow neutral to acid soils (10-20") underlain by rock virtually impenetrable by roots.

Ps - PANSPOTS: Areas where hard clays or other impervious materials lie close to or at the surface in shallow depressions which occupy 20 to 50% of the area.

DC - DENSE CLAY: Relatively impervious deep but dispersed clays—may be overlain by thin but ineffectual layers of other materials. The dispersed layer is very hard to extremely hard when dry and very sticky when wet.

TB - THIN BREAKS: Mixed soils of various depths derived from different parent materials that outcrop at different levels forming irregular slopes of from 20 to 65 percent. Trees may occur locally above outcrops.

Cr - GRAVEL: Uplands where rock fragments of gravel or small stone size compose most of the soil with coarse materials greatly reducing moisture retention with apparent effects on both amount and kind of native vegetation.

VS - VERY SHALLOW: Areas where few roots can penetrate deeper than 10". Outcropping of gravel or bedrock is characteristic. Joints in bedrock may develop deep soil pockets usually marked by tall grasses, shrubs, or stunted trees.

SU - SALINE UPLAND: Uplands of ordinary depth where salt and/or alkali accumulations are apparent and halophytes occur over a major part of the area.

Sh - SHALE: Readily puddled uplands where some unweathered angular raw shale fragments are exposed at the surface and little, if any, soil profile development is evident.

Bl - BADLANDS: Nearly barren lands broken by drainages dry most of the year, with intermingled grazable areas too small or too narrow to justify mapping separately.

YEAR-LONG FORAGE-ROUGHAGE-LIVESTOCK BALANCE

(Work Sheet--File Final Copy in Office Copy of Conservation Plan)

Ranch Bruce M. Cady SCD ____ Acres ____

TABLE I. Present Grazing and Harvested Roughage, 19__

Kind of Grazing	Acres	AUM's	Harvested Roughage	Acres	Tons	AUM Equivalent
Permits - Federal	XXX		Native Hay			
	XXX		Tame Hay	100	150	450
	XXX		Silage			
Native Pastures	1576	523				
Permanent Tame Pastures	224	448	TOTAL	100	150	(2) 450
Temporary Tame Pastures						
Crop Aftermath						
Meadow Grazing						
TOTAL		(1) 971				

Tons hay x 3 and tons silage x 1.5 will permit accumulation of some emergency feed. Subtract unusually great amount put to reserves, or usual amount sold before entering AUM's in Table II.

Excess to emergency reserve ____

Excess to be sold ____

TABLE II. Present Grazing and Harvested Roughage Balance

AUM's from grazing (1) 971
AUM's from roughage (2) 450
*TOTAL AUM's (3) 1421

Total AUM's (3) / 12 months = 1421 / 12 = 118 AU's (4) grazing and roughage an unit at present.

Months From Grazing

AUM's from grazing (1) / AU's grazing and roughage (4) = 971 / 118 = 8 Mo.

Months From Harvested Roughage

AUM's from roughage (2) / AU's grazing and roughage (4) = 450 / 118 = 4 Mo.

TABLE III. Anticipated Grazing and Harvested Roughage After Conservation Plan Applied in 19__

Kind of Grazing	Acres	AUM's	Harvested Roughage	Acres	Tons	AUM Equivalent
Permits - Federal Range	XXX		Native Hay			
	XXX		Tame Hay			
	XXX		Silage			
Native Pastures	S A M E					
Permanent Tame Pastures			TOTAL			(6)
Temporary Tame Pastures						
Crop Aftermath						
Meadow Grazing						
TOTAL		(5)				

TABLE IV. Anticipated Grazing and Harvested Roughage Balance After Conservation Plan is Applied

AUM's from grazing (5) ____
AUM's from roughage (6) ____
TOTAL AUM's (7) S A M E

Total AUM's (7) / 12 months = ____ / 12 = ____ AU's (8) grazing and roughage an unit.

Months From Grazing

AUM's from grazing (5) / AU's of grazing & roughage (8) = ____ = ____ Mo.

Months From Harvested Roughage

AUM's from roughage (6) / AU's of grazing & roughage (8) = ____ = ____ Months

* Check against Table V for present livestock-feed and forage balance and Table VI for proper Initial Stocking Rate.
(1) Circled numbers indicate sequence of data in calculations.

USDA SCP-PORTLAND, ORE. 1960 M-4371

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

November 16, 1973
Joliet, Montana

Mr Wayne E. Stephens
Director Planning Support Group B.I.A
Federal Building
Billings, Montana

Dear Sir:

After reading the draft environmental statement of the Crow ceded area coal Lease Westmoreland Resources Mining proposal I fail to understand how a permit could possibly be granted.

Westmoreland claimes they will disturb 1280 acres over the 20-year project life. Present commitments call for 77,000,000 tons of coal being mined. 1. Westmoreland has granted Colorado Interstate Gas Company an option to acquire up to 300 million tons of coal. This option may be exercised anytime before November 30, 1981. This will add another 300,000,000 tons of coal. This mining should disturb approximately 4,320 acres at the rate of 1280 producing 77,000,000 tons of coal. This is much more than the 12,80 acres Westmoreland would have us believe they were disturbing.

1. Any mining in excess of that included in the statement would require new assessment and approval.

2. The productivity of this land was very much under estimated. According to Westmoreland soil samples analizes land having very severe limitations, requiring intensive conservation measures, and very careful management if occasionally cultivated produced 30 bushel an acre wheat this last year and has been cultivated many years before. Another area under this same classification, on the opposite side of and adjacent to the mine site, was cultivated and raised 30 to 35 bushel an acre grain consistently for many year before being sowed to alfalfa and crested wheatgrasses for hay. These two fields are less than ½ mile from Westmorelands property termed "too shallow for successful farming". One lies to the north and one to the south of the mine site. Is this the "shallow, sandy topsoil unsuitable for dry farming"?

2. Text changed - See also responses to comments of Ed Dobson and John Redding at the hearing.

Also the grazing land will run a cow and calf unit for every 15 to 20 acres. This is much less than the 51 to 54 acres claimed by Westmoreland for this same land. The prices for livestock quoted in the study are much lower than was received this past year from calves in this vicinity. One hundred eighty dollars per head compared to \$240 per head average calves.

3. Westmoreland claims they have mineral rights on the entire tract. In reality only the coal rights belong to Westmoreland on land which they haven't obtained the surface. All other mineral rights belong to the surface owners and others. They state that "remaining surface rights of Tract III will be obtained through continued negotiations". Westmoreland had been informed many times these surface owners will not sell their surface rights. No negotiations have taken place for over a one year period. Negotiations are halted indefinitely.

Westmoreland gives no guarantee that the mining will not affect surface water. In fact they indicate the opposite. The actual mining may not only render 1,280 acres sterile but will decrease the production level of many additional acres by reducing or eliminating the flow

4. of surface water. Cattle do not graze lands where there is not water!

They state that many of the spoilbanks will be infested with weeds such as Canadian thistle, leafy spurge and knapweed. Is this making the land better than before mining as they have claimed? The permeability of the replaced soils will possibly have a detrimental affect on the growth of productive vegetation.

In almost every section of the study Westmoreland states that more research is needed in this area or information was unavailable for this area or the data was collected in Colstrip or Decker which is a similar area. I believe this constitutes insufficient study of the area. If Sarpy Creek is the mine site data should

3. Westmoreland has acquired the surface rights for the initial mining site. See text on page 118 for clarification on ownership of minerals other than coal.

4. It is acknowledged that the mining development will slightly reduce the quantity of surface water contributed to downstream water courses if total retention of surface runoff and mine drainage water in Westmoreland's sediment detention dam is practised. However, it cannot be construed that downstream surface water supplies will be radically affected by a detention dam that would retain runoff from less than two square miles of area at most, when the total Sarpy Creek drainage area is comprised of about 470 square miles.

Detention and subsequent slow release of flood runoff water may also be practised, subject to approval of applicable regulatory agencies. This would provide some mitigation of possible flood damages downstream, as well as a more dependable source of surface water if releases are made during dry periods.

Release of water from the sediment detention dam will be dependent upon several factors.

1. Contaminated water problems that may occur must be adequately treated before release is made to downstream users.

2. Released waters must conform to water quality standards of the State of Montana (State Water Pollution Control Act, 1971). In the Sarpy Creek drainage area these standards require that surface waters conform to category B-D_3.

In summary this means that the water in these drainages shall be suitable for domestic use with (after) adequate treatment equal to normal surface water treatment plant processes and any additional treatment necessary to remove naturally present impurities. In addition, the stream water shall be suitable for the growth and propogation of non-salmoned fishes and associated aquatic life, waterfowl and furbearers.

be for the Sarpy Creek Area.

Westmoreland is certain they can reclaim this land in five or six years. Yet other mines in Montana haven't shown satisfactory results and they have had these spoilbanks considerably longer than five or six years. Out
5. of 77 soil survey listed 50 are rated fair to poor for top-soiling quality. Where will Westmoreland obtain the six inches of topsoil for its spoil banks when they have removed only 1 to two inches to begin with?

I believe this permit should be denied due to lack of sufficient evidence that the land can be reclaimed and because of the uncertainty of maintaining sufficient water on adjoining lands not owned by Westmoreland Resources. This mining will not improve but deteriorate this productive area and therefore should not be allowed.

Sincerely,

Gay Haynie
Rt. Box 99
Joliet, Montana

5. Top soil maps prepared by competent soil scientists showing that adequate top soil is available.

RECEIVED
NOV 1973
Billings, Montana

aad
PSG

724 Birch Lane
Billings, Montana

November 15, 1973

Mr. James Canan
Area Director
Bureau of Indian Affairs
Federal Building
Billings, Montana

SUBJECT: Draft Environmental Statement, Crow Ceded Area Coal Lease, Westmoreland Resources Mining Proposal

Sir:

Having reviewed the Draft Environmental Statement and in response to your request for public comment regarding said statement, I am submitting the following critique.

a. It is my opinion that the social impact statements contained in the DES are inadequate and in need of substantial revision before they can be considered in compliance with the National Environmental Policy Act of 1969 (NEPA). The following discussion is submitted in support of this statement.

It is mandated in Section 102 (2) (A) of NEPA that:

> The Congress authorizes and directs that to the fullest extent possible...all agencies of the Federal Government shall--utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment;...

In 115 Congressional Record 40417-40418 (1970) we see the following discussion relevant to the above phraseology:

> The purpose of the new language is to make it clear that each agency of the federal government shall comply with the directives set out in * * * /Section 102(2)/ unless the existing law applicable to such agency's operations expressly prohibits or makes full compliance with one of the directives impossible. * * * Thus, it is the intent of the conferees that the provision "to the fullest extent possible" shall not be used by any federal agency as a means of avoiding compliance with the directives set out in Section 102. Rather, the language in Section 102 is intended to assure that all agencies of the federal government shall comply with the directives set out in said Section "to the fullest extent possible" under their statutory authorizations and that no agency shall utilize an excessively narrow construction of its existing statutory authorization to avoid compliance.

Based on the above statements and on additional references which will be presented in the text of this letter I submit that the Planning Support Group's DES has not been in compliance with NEPA regarding its social impact statements. The following points are intended as clarification and as guideposts for further, more expansive, studies relevant to the Sarpy proposal.

1.) Baseline demographic data is either inadequate or missing.

In Environmental Defense Fund, Inc. v. Hardin, supra, 325 F. Supp. at 1403, Judge Gasch stated:

> Section 4332(2)(A) * * * makes the completion of an adequate research program a prerequisite to agency action. The adequacy of the research should be judged in light of the scope of the proposed program and the extent to which existing knowledge raises the possibility of potential adverse environmental effects. * * * This provision of the Act requires a diligent research effort, undertaken in good faith, which utilizes effective methods and reflects the current state of the art of relevant scientific disciplines.

Further, in Environmental Defense Fund, Inc. v. Corps of Engineers, supra, 348 F. Supp. at 927-928, the court stated:

> The systematic, interdisciplinary approach of Sec. 102(2)(A) is designed to assure better programs and a better environment by bringing together the skills of the biologist, the geologist, the engineer and the landscape architect, the economist, the sociologist, and other disciplines relevant to the project.

From the above we see where NEPA mandates that the research methodology "reflects the current state of the art." The pedestrian and cursory treatment paid this provision in the BIA statement is evident throughout but is especially obvious in Chapter II, Environmental Setting, Human Environment, pages 35-36.

Population figures are generalized to total county levels and reservation levels. Figure 3, "Population Trends in Big Horn and Treasure Counties" shows growth only to 1970.

Missing entirely are population figures by towns, i.e., Hardin, Crow Agency, St. Xavier, and so on. Also missing are breakdowns of population characteristics such as race, educational levels, religious affiliations, political characteristics, attitudinal characteristics and aspirations of indigenous groups, crime rates, divorce rates, alcoholic rates, etc.

a - It is agreed that the intent of NEPA is to prepare a study that has "a fully integrated, systematic, interdisciplinary approach." Also, that the "adequacy of research should be judged in the light of the scope of the proposed program and the extent to which existing knowledge raises the possibility of potential adverse effects." The preparation of this EIS has followed these principles diligently.

Two other principles of social research have been faced realistically:

(1) that the particular project being evaluated has no direct causal relationship to a greatly expanded industrial or any other socio-economic development in the immediate area, and (2) that the diverse nature of the limited Westmoreland development (with only 90 employees projected), spreads a correspondingly limited social impact over an extensive geographic area, makes it impossible to measure with any degree of precision.

A current assessment is being made of the potential impact of large scale coal extraction and utilization which will affect all of the Crow Reservation, and its membership. In this effort the projected socio-economic impact of the large scale industrialization and urbanization on rural communities will be assessed to the fullest extent possible. The confines of the Westmoreland project puts very serious limitations on social research methodology, prohibiting the expansion of available data to more comprehensive and precise terms. This is not an excuse for "pedestrian and cursory treatment" but a realization of relevant limitations.

1. The latest official U.S. census figures have been used giving population for the directly affected counties and giving specific figures for the Sarpy Census Division. Hardin is the shopping and trade center for the area and had a 1970 population of 2733. One-hundred sixty-five of these were Indian. Further data is not needed for the immediate project.

Other baseline data needed includes health characteristics, social behavioural characteristics such as social affiliations and organizations, life styles, etc. Baseline employment data is missing, including figures detailing the available work force (Indian and non-Indian), available employers (and kinds), job titles, pay scales (organized historically and by job title).

Baseline data on existing community services (governmental and non-governmental) are also non-existent in this DES.

This data is absolutely essential since without it one is unable to adequately measure and evaluate quantitative and qualitative changes based on subsequent development and growth.

2.) Manning tables are missing.
Chapter III, Environmental Impacts, Human Environment

There are no manning tables presented in the DES to show impact of mine site development. Also manning tables are missing for mine site operation. During the developmental phase who are the contractors and sub-contractors? What jobs existed? What were the pay scales? What was the timing element (no flow chart exists detailing the term of employment by specific contractors or job titles)?

Page 95, paragraph 1, mentions the May 10, 1973 dragline assembly and site preparation workforce as being 53 with 36 (68%) being Indian. At that time what other work was being done (railroad spur, transmission line construction, etc.) and what were the employment figures, especially by Indian and non-Indian workers?

2. The Crow Tribe and the mining contracts have been working together in planning the staffing of mining positions. Westmoreland has stated the contractor plans to employ approximately 90 men of which half or more are expected to be members of the tribe. (See Appendix K.) It is further estimated that 80 to 90 percent of this total will be local employees who will make no change in residence.

3.) Multipliers are vague and unsupported.
Chapter III, pages 93-96.

No family multipliers are used to show overall population growth for area (by county and towns). Employment multipliers used are not substantiated. On what basis do you feel they relate to Hardin/Sarpy/Crow? Who developed them (specifically)? When were they developed and for whom? Are they industrial multipliers? Without the combination of employment and family multipliers, regionalized to the impact area, how did you conclude that the population growth in the area would be around ten percent?

3. There have been no input-output studies made on the proposed Westmoreland Project. The multiplier factors used in this assessment have been developed through more comprehensive studies in western areas under similar conditions. The 2.7 multiplier factor has been utilized as an appropriate measure for economic development by the State of Montana.

The worker-non-worker ratio assumed for this study was 1 : 3. This means that for every person employed two non-workers would be added to the population.

Chapter IV, Mitigating Measures Included in the Proposed Action, Human Environment.

3a. On page 133, paragraph 2, you write, "It is anticipated that the influx of workers and families into Hardin will cause a population increase of no more than 10%, including a multiplier effect." What was the population of Hardin before any work began on the mine? What multipliers are you writing about? Who developed them? Why do you think they relate to Hardin? Does this 10% growth relate to mine site construction, to mine site operation, or both? What is the difference if one exists? Have you met with the existing City/County Planning Board in Hardin to discuss this increase or its effects on the "city governmental entities" you mentioned? A recent survey of new dwelling units in Hardin shows an increase of some 115 such residents during the past year (according to the Montana-Dakota Utilities manager in Hardin) and an increase in school enrollment for Hardin's two school districts of 153 students over last years enrollment (Hardin Herald, October 11, 1973, page 1). How do these figures relate to your 10% projection? Again, it is essential that you show how you arrived at this projection.

3a. The study projects that the population of Hardin and Big Horn County will increase by not more than 10 percent over the 1970 population as a direct or indirect result of Westmoreland mining operations. It does not project the total population change caused by other changes in economic activity in the area.

City officials in Hardin were contacted to determine the capacity of the institutions and services for any anticipated population change resulting from the Westmoreland Project.

4.) Preferential Hiring of Crows.

Does this exist during construction phase of mine site and are sub-contractors honoring this agreement? On page 94, paragraph 3, you write, "A program of counseling for the trainees will be carried out jointly by the tribe and the mining contractor." What is the nature of this counseling (is it remedial for trainees experiencing work adjustment problems or is it ongoing and included in the continuing education training program; does it include behavioral modification in order to, and I quote you, "develop a sense of responsibility among the Indian work force")?

What influences will the various trade unions have on hiring practices? How might this effect hiring of non-union workers, including Indians?

4. The nature of counseling and training includes: recognition of individual problems and skills; improving communications; promoting cultural understanding; and measuring progress and performance. The tribe will help select trainees and will assist in counseling.

Although much is written in this DES about preferential hiring of Crows, nothing is mentioned about Indian dissatisfaction over hiring and work practices (especially prejudicial hiring practices concerning Indians). While many Crows talk about these problems, the BIA ignores them in this report. Why? On page 1 of this DES the following statement concerning the BIA's trust responsibilities is made: "The policy of the Department (of Interior) is to approve the leasing of Indian mineral resources (1) under terms and conditions in the best interest of the Indian tribe." Is it in the best interest of the tribe to ignore legitimate complaints concerning Indian hiring and working conditions? Or is the Bureau simply ignorant of such problems?

5.) Discussion is non-existent concerning tribal income distribution.

Chapter III, Human Environment.

On page 97, paragraph 1, the following comment is made: "The extent and effect of the cultural change depends to a large degree on the manner in which the Tribe uses or distributes the Tribal income derived from coal royalties." How do you propose to measure the "extent and effect of the cultural change" without first enumerating on the historical spending patterns of the Tribe and its members? Such baseline data does not exist in this DES. Further, it is essential that some discussion be included about Hardin as a primary trade center for the reservation.

5. The policy of the U.S. Government in their relationship to Indian tribes is maximum self-determination. It will be the responsibility of the Crow Tribe to develop policies, programs, and procedures for distributing tribal income from coal. As stated in the final EIS, this process is now underway.

6.) Displacement of ranchers.

Chapter III, page 97, paragraph 3.

Your statement "Displacement of ranchers living in the mining area will be minimal" is not only a gross misrepresentation of fact but it must rank as one of the greatest bits of fiction writing I have ever read. How do you account for the explosive situation on the Sarpy between some ranchers and coal company representatives already evidenced in threats of land condemnation, shootings, and who knows what other unreported provocations from both sides? Are these incidents to be dismissed as "minimal"? Why has this impact not been discussed and evaluated in the DES? It most surely warrants a detailed analysis.

6. Westmoreland is constructing the mine facilities on land which it owns. Furthermore, they have leased back land to the ranchers, therefore, there have been no ranch families displaced.

It is impossible to evaluate causes of emotional outbursts as the apparent and real motivations behind the episodes are difficult to determine.

7.) Community impacts are not adequately evaluated.

What new community social services, regulatory agencies and authorities, governmental and non-governmental services, retail/wholesale outlets, and other supportive services will be required to adequately accomodate this development and its projected growth? Where will these services be located? How soon will they be needed? Hardin's schools are already overcrowded, especially the junior high building. Can they absorb further growth without expansion? Why wasn't the district's school superintendent consulted about this problem? How will any new growth be financed and how do the local taxpayers feel about paying for this possible expansion? How has the quality of education been affected by the influx of new students to the Hardin schools?

Are community health services adequate to handle rapid growth in these areas? These and other community service aspects need to be given considerable attention in the next statement.

What of the growth in population in the immediate mine area (Sarpy Road)? Already a bar/cafe and some 15 trailer homes have been located in this vicinity in direct support of this mine. What will be the impact of this and further growth on this area? Whose responsibility is it to regulate this growth? Have you brought this problem to the attention of the appropriate agencies? If not, why not?

Chapter V, Unavoidable Adverse Environmental Effects, Human Impacts.

7. The present mining operation will bring its major impact to Hardin. The impact to other communities will be small compared to the Hardin impact.

The Big Horn County officials are aware of the mining impacts and are actively working on programs to meet increased demands in social services as indicated by comments from the county law enforcement officials, school superintendent, county commissioners, and the Hardin Chamber of Commerce.

In paragraph 3, page 155, you state: "There will be a moderate increase (up to 10%) in the population of the surrounding towns." You continue, "This rapid population increase, accompanied by the urbanization process will result in an increase in social problems in the small towns around the mining site." Are we to assume from the above that not only Hardin but all the other surrounding towns (Forsyth, Crow Agency, Busby, etc.)will also experience a 10% population growth from this one mine? If this is your testimony then you need to evaluate the social impacts of this mining on these towns as has already been outlined in this letter.

Rather than doing the above you chose to conclude your perfunctory remarks with the following incomprehensible statement: "The adverse social effects of any endeavor or development can be measured only in terms of the inhibiting characteristics of social change on reaching social goals." I'm sure tribal officials as well as other public representatives will find comfort in this tidbit of bureaucratic wisdom especially when they are left to deal with the "adverse social effects of this endeavor."

Surely you could not have misconstrued the meaning of NEPA Sec. 102 (2) (F) regarding your responsibilities to provide useful information to impacted areas. It reads quite precisely:

> ...all agencies of the Federal Government shall--make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment.

8.) Alternatives.

In Chapter VI, Alternatives to the Proposed Action you again elected to ignore NEPA by not considering social impacts to the alternatives here discussed. In NEPA Sec. 102 (2) (C) (iii) we find the following mandate:

> ...all agencies of the Federal Government shall--include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on--Alternatives to the proposed action.

The next report should consider each of these alternatives and their relative social impacts on the communities.

8. No response required.

9.) Qualitative analyses are inadequate.

NEPA Sec. 102 (2) (B) states:

> ...all agencies of the Federal Government shall--Identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations.

Where are these "unquantified environmental amenities and values" given appropriate consideration in this DES? Specifically, where are we to find discussions dealing with the value orientations of the Indian and non-Indian communities vis-a-vis the coal mining operation proposal? No such attitudinal considerations are dealt with in this report. How do the ranchers feel about coal development? or businessmen? Or any other indigenous group? Without knowing how these people feel about this mining plan how are we to ascertain impacts?

What are the aspirations of the people in the impacted area? What do these people want for themselves and their communities? How do these aspirations relate to coal development? These and other pertinent qualitative analyses must be explored and articulated in the next EIS report.

9. The aspirations of the Crow Tribe and its people have been stated and demonstrated at the hearings and before. They must be allowed self-determination in their dealings with the mining company as well as use of their income from this source.

10.) Human impacts from rapid industrialization are not adequately examined.

Dr. ElDean V. Kohrs of the Casper Counseling Center, Casper, Wyoming has given the name "the Gillette Syndrome" to the problems experienced by people living in a rapid growth area. General feelings of malaise, loss of appetite, severe depression are some of the accompaning ills. Divorce rates go up, as do rates of alcoholism, tensions on the children, delinquency, and so on. How might these problems effect the communities and the people, Indian and non-Indian alike, in the Sarpy impact area? Are local institutions adequately staffed and funded to deal with these "human" problems? If not, what new services are needed?

10. This project does not involve rapid industrialization in the conventional meaning.

Summation.

In the Bureau's DES report the writers chose not to explore the above listed problems. Instead, the writers concentrated--to an exaggerated degree--on what they conceived as positive impacts, i.e., the monetary benefits of this mining to the Tribe and its members. No one could rightly question that the Tribe should get this money. Quite the contrary, they should be getting far more.

The issue I raise as a Sociologist, and as one more interested in people than in the short term benefits of a boom economy, is that in their haste to "sell" this report to the Tribe, the public, and to other public officials, the Bureau has taken a far too restrictive approach to its trust responsibilities to the Tribe. Additionally, the Bureau has evidently failed to grasp the mandates of the National Environmental Policy Act, as is repeatedly pointed out in this letter. The victims of these failures will be the people, Indian people and non-Indian people.

It is my opinion, therefore, that in its follow-up statement, considerable refinement, if not total redirection, be made with regard to the social impact statements. Failing this, it would be my opinion that the permit to mine not be granted.

JOHN L. SCHWECHTEN
Billings, Montana

cc: (15)

PHONE 252-1095
AREA CODE 406

JOE H. RAWLINS
CONSULTING GEOLOGIST

310 SECURITIES BUILDING
BILLINGS, MONTANA 59101

November 2, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th St.
Billings, MT 59101

Dear Mr. Stephens:

After reviewing the draft of the Environmental Impact Statement for the mining of Crow Indian-owned coal in the Sarpy Creek area, the following comments are offered for your consideration:

(1) Regarding Page 181 under (2)a, "$700,000 annually for 20 years" should read "$700,000 annually for the first 10 years, and since the royalty rate is negotiable after 10 years, the second 10-year period may be expected to increase to the neighborhood of 1 million dollars per year, depending on the re-negotiated royalty rates."

1. Page 181 corrected to reflect comment.

(2) The location of the Westmoreland Resources plant is situated entirely outside the Crow Reservation boundary and does not affect any Crow Indian family; its location affects only very few non-Indian ranching or farming families. Therefore, the benefits to be derived in the form of employment and income to the Crows far outweighs the minor adverse effects of the mining operation.

(3) The Burlington Northern rail line to Westmoreland Resources' mine also opens up the potential for Amax and Peabody Crow-owned coal to be mined, with additional monetary and employment benefits for the Crows. I would estimate total coal reserves in the entire Sarpy Creek area to be from 1½ to 2 billion tons, all Crow-owned.

I feel the value to the Crows in just having the physical coal mining facilities located at Sarpy Creek is so great that it is difficult to place a monetary value on its worth. Certainly, the rewards to the Crow Tribe of Indians will be tremendous.

Yours very truly,

Joe H Rawlins

Joe H. Rawlins

November 2, 1973

United States Department of Interior
Bureau of Indian Affairs
Planning Support Group
316 North 26th Street
Billings, Montana 59101

Attention: Mr. Wayne Stephens, Director

Dear Mr. Stephens:

No response required.

I have read the Draft Environmental Statement covering the Crow Ceded Area as prepared by the Department of Interior and dated October 1, 1973.

I am very much impressed by the thoroughness of the Environmental Statement. I guess I never really thought so much research and care was actually being undertaken prior to a project of this nature actually commencing development.

I was born and raised in Laurel, Montana, and feel that this project should move forward without delay.

Sincerely,

Lewis N. Andrews
P.O.Box 1357, Billings 59103
LNA:sa

THE TIME AND TEMPERATURE BANK

BIG HORN COUNTY
State Bank
HARDIN, MONTANA

November 2, 1973

J. WILLIAM SMITH CASHIER

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana

Dear Mr. Stephens:

We are vitally interested as to the impact the Westmoreland Resources strip mining operation will have in our community and were pleased to have the opportunity to read the very complete environmental statement.

No response required.

The economic impact on our community of this mining operation will be very desirable, not only from the standpoint of additional employment, which is desperately needed on the Reservation, but also from the standpoint of additional income for all Crow Tribal members, which they surely do need.

We are naturally very concerned with the ecology of our area but from the environmental statement covering this mining proposal it shows a great amount of research, study and analysis have gone into their report, and we believe the ecology impact is also of prime importance to Westmoreland.

We firmly believe that with the modern technological expertise and protective mining laws we have very little to fear ecologically in a strip mining operation in the proposed area, especially when there is to be no power or gasification plants involved and where the topsoil is to be stockpiled and the reseeding of disturbed areas systematically carried out.

Another factor we cannot completely ignore is the very great need and shortage of electrical energy in our nation which the mined coal will help supply.

For the overall good of our community, the Crow Tribe, and to help in supplying our nation's electrical power, we hope that Westmoreland's Resourses Mining Proposal will be looked on with favor.

Sincerely,

J. William Smith
Sr. Vice President
Big Horn County State Bank

JWS/ao

WINSTON L. COX
525 SECURITIES BUILDING
BILLINGS, MONT. 59101

November 1, 1973

Director, Planning Support Group
Bureau of Indian Affairs
316 North 26th St
Billings, Montana 59101

Dear Sirs: -

Undoubtably, there will be a great hue and cry at your hearing in Hardin next week by the various groups against the Sarpy coal mining operation. I trust that you will weigh their arguments, usually unsupported by facts, against the really exhaustive studies which have been made, and the very real need for the coal.

Very truly yours

Winston L. Cox

No response required.

PHILIP N. FORTIN
500 PETROLEUM BUILDING
BILLINGS, MONTANA
59103

November 2, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Re: Westmoreland Resources Mining
Proposal - Sarpy Creek Area

Dear Mr. Stephens:

My comments in this letter are made relative to the draft of the environmental statement which has been prepared by the Bureau of Indian Affairs covering the Sarpy Creek Area in Big Horn County, Montana, where Westmoreland Resources proposes to surface mine coal.

I have had an opportunity to review this environmental statement and believe that its contents fit the parameters of the Environmental Protection Act, which requires the preparation of and comment on such a study before the mining plan can be approved by the Secretary of the Interior.

Looking at the entire operation from an overview of what it will accomplish on a regional and national level, I believe that the numerous advantages far outweigh the disadvantages of such an operation.

No response required.

The number of individuals directly affected by such an operation is somewhat minimal if you consider the overall benefit to the easing of our national energy crisis. I have been involved in the oil and gas exploration business, as well as having had some marketing and refining experience, for approximately 50 years. Never before have I seen our country faced with the magnitude of such energy shortage as we see today. At the present time, it appears that coal is rapidly becoming the cheapest form of available energy to the American public. We are already seeing imported natural gas and crude oil prices reaching levels which we never dreamed possible even only three years ago.

Even if not viewed from a national level, the opening of a mine at Sarpy Creek would have a tremendous financial impact on the Crow tribe. Royalties derived from the mining of this coal would go far toward assisting the Crow tribe to become more self-sufficient and the income to the Indians employed at the mine would undoubtedly also be quite substantial.

Therefore, I believe that the advantages to opening such a mine far outweigh the disadvantages, and I wish to go on record as being in favor of the Sarpy Creek operation.

Very truly yours,

Philip N. Fortin
Philip N. Fortin

PNF:hg

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November 19, 1973

THEODORE VOORHEES

Hon. Marvin L. Franklin
Deputy Assistant to the
Secretary of Interior Department
C Street between 18th & 19th N.W.
Washington, DC 20242

Dear Mr. Franklin:

Westmoreland Resources desires to file several comments on the draft Environmental Impact Statement which has been prepared by the BIA in connection with our application for the approval of the Crow Ceded Area Coal Lease and Westmoreland Resources Mining Proposal.

We believe that the BIA has prepared the most complete and comprehensive impact statement that has yet been filed in connection with the mining of coal, and that the results of its studies fully justify the approval of our mining proposal. Several observations upon the statement, however, seem to us to deserve to be called to your attention.

I. The Energy Crisis.

We do not believe that the EIS does justice to the importance of the energy crisis. We urge that no statement that purports to compare the environmental and economic considerations with respect to the opening of a coal mine, can lay claim to objectivity or impartiality if the country's energy requirements are left outside the discussion.

We suggest that you include in the final draft the attached affidavit of Dr. Ralph E. Lapp. Dr. Lapp is one of the country's most distinguished nuclear physicists, and his affidavit contains a brief but comprehensive analysis of the energy crisis and the importance of western coal in meeting it. The affidavit was filed as an exhibit in the case of Sierra Club et al. vs Morton et al., U.S. District Court for the District of Columbia CA No 1182-73.

Perhaps reference might also be made to the recent studies of the Chase Manhattan Bank and the National Petroleum Council on the subject of the developing fuel crisis. (Outlook for Energy in the United States to 1985, published by the Chase Manhattan Bank, June 1972, and Report on United States Energy Outlook, a study published December 11, 1972, by a consultants committee brought together by the National Petroleum Council.)

II. The Claimed Need for an Area-wide Impact Statement.

No response required.

We support the decision of the Interior Department to base its approval or disapproval of the mining plan on an environmental impact statement dealing with this specific project, rather than to await the preparation and filing of a regional or four-state, area-wide statement as advocated by the environmentalist organizations that have brought the above mentioned suit against the Secretary of the Interior to compel the preparation of such a statement.

The plaintiffs in that lawsuit have chosen to seek a ruling by the court on that subject rather than to accept the expertise of the Interior Department as to its own needs prior to its decision-making. Nonetheless, in anticipation of a possible criticism of the EIS on this point, we desire to include in our comment the reasons why we believe there is no need for an area-wide statement in so far as this project is concerned.

It should be pointed out that the Sarpy Creek mine is an entirely localized operation having no relation whatever to any other development in any part of the State of Montana. The area of the mine is very sparsely populated, with only one hundred and thirty-two habitations within a radius of twenty miles. Westmoreland Resources owns 12,487 acres of the surface in the general area of the mine and has an option to purchase an additional 4,891 acres. At most only a handful of people will feel any effects of the mining operation.

There can be no evidence of any cumulative effects that could be produced by any combination of applicant's mine and any other coal development, since no mining plans within the Crow Reservation or the Ceded Strip Area have progressed to the extent where the BIA has considered them and commenced the preparation of an EIS. Peabody Coal Company's development at Colstrip, the only other one awaiting approval in the entire area, is approximately 25 miles away, and the two operations cannot have any effects that will interrelate in any way. Should any coal company with a lease or prospecting permit come forward at some time in the future and seek approval of a mining plan within the area, there will of course be a need for a new impact statement and perhaps a study of that mine's cumulative effects may then be called for. At the present time, the suggestion that there be an area-wide impact statement in order to permit a study of cumulative effects of one lone operation, would be wholly futile.

Many other objections to an area-wide approach might be cited, but it may suffice to mention three.

First, the fact that the coal is Indian-owned makes the suggestion that there should be an area-wide impact statement particularly inappropriate. As stated on page 1 of the EIS, the policy of the Department is to approve leasing of Indian resources under terms in the best interests of the Indians and with appropriate environmental safeguards. This certainly does not mean that the Secretary is to examine the environmental concerns of people all over a four-state area in connection with a development of Indian resources as to which the general public have no legitimate concern. It may be granted that the very few non-Indians who live within an area close enough to be affected by the mine are entitled to be heard on the subject of the project, but they would be hard pressed to explain how their interests could be better explored and protected with a regional impact statement than with one which concentrates on the immediate area of the mine.

No response required.

Secondly, a study of environmental conditions in a multi-state area would be inferior in every way to the project EIS in the case of this particular mine. To develop for such a large area the same type of studies in depth as have formed the basis of the BIA impact statement, would take so long that the delay would destroy any possibility of securing approval of the mining application in time for Westmoreland Resources to fulfill its contractual obligations for the delivery of the coal.

Thirdly, with the completion of the present EIS, the Secretary of the Interior is in a position to judge whether he has enough information on which to base his decision or whether something more is required. In the light of the extremely detailed study made by the BIA, we urge that the burden of proving that more study is needed should rest heavily upon the one who asserts it.

III. Plan for Future Mining.

Westmoreland Resources has been advised that there has been some criticism of its mining plan for failure to cover more than a five year development while the sales contracts require mining and delivery of coal for a period of twenty years.

We know of no requirement in NEPA, or elsewhere, that would prevent approval of a lease or mining plan because of the failure of the developer to project exact plans covering every phase of the operation during its entire lifetime. The cases that have arisen under the statute have made it clear that the developer will not be required to speculate as to future plans, and that NEPA requirements will be fully met by an impact statement dealing with only that part of a project that is fully planned when an EIS is prepared. It is then understood that new or supplemental statements will have to be filed in connection with future parts of the project as the plans for them develop.

A memorandum reviewing the court decisions on this point is enclosed with this letter of comment.

IV. The Interests of the Crow Tribe.

We have been advised that in the light of the public hearing that was held at the Crow Agency on November 13, the Crow Tribe are not planning to comment on the EIS. It seemed to us, however, that for the record you should be furnished with a copy of the enclosed affidavit of Mr. David J. Stewart, Chief of the Crow Tribal Council. It was prepared at our request and filed with the court in the above mentioned suit against Secretary Morton.

Yours sincerely,

Westmoreland Resources

by Theodore Voorhees
Attorney

TV:jnw

enclosures

MEMORANDUM

November 16, 1973

Re: Sufficiency of a Five Year Mining Plan

The determination of what is to be included within an environmental impact statement is to a great extent left to the discretion of the agency charged with its preparation. NEPA places the onus of formulating an E.I.S. solely on the agency, and unless there is some indication that the agency's procedures will not allow it to comply with its statutory duty, the courts will defer to the agency's discretion, Greene County Planning Board v. Federal Power Com'n., 455 F. 2d 412 (2d Cir. 1972).

Thus the determination as to whether or not an environmental impact statement covering five years of a twenty year program is adequate to satisfy the requirements of NEPA is left to the discretion of the Department of the Interior and unless the determination is irrational, arbitrary or capricious, the agency's determination of a workable unit will not be disturbed by any court, Movement Against Destruction v Volpe, 5 E.R.C. 1625, (D. Md. 1973).

Although the requirement to issue an E.I.S. at each stage of agency decision-making is not inherently flexible or discretionary, the statute does give the agency some discretion as to content, Committee for Nuclear Responsibility v Seaborg, 463 F. 2d 783 (D.C. Cir. 1971). The courts realize that the issues, format, length and detail of an E.I.S. must by necessity differ from case to case and where future impacts are neither predictable nor foreseeable, NEPA does not require the agency to make such predictions.

There is nothing in Scientists' Institute for Public Information, Inc. v Atomic Energy Commission, 481 F. 2d 1079 (D.C. Cir. 1973) which would require deferral of an E.I.S. until full details of a twenty-year mining plan could be finalized and disclosed. To the contrary, the court in that case merely required the Commission to prepare an E.I.S. covering a survey of what was immediately and reasonably foreseeable with respect to its research program. The court said at page 1092:

> If the Commission's environmental survey is prepared and issued in accordance with NEPA procedures, and if the Commission makes a good faith effort in a survey to describe the reasonably foreseeable environmental impact of the program, alternatives to the programs and their foreseeable environmental impact, and the irreversible and irretrievable commitment of resources the program involves, we see no reason why the survey will not fully satisfy the requirements of section 102 (C).

While the entire Westmoreland mining project contemplates a disturbance of no more than 1280 acres, Westmoreland Resources has a lease from the Crow of 14,745.92 acres, and is the owner of 12,487 acres of surface lands with 4,891 additional acres under option to purchase. It should be obvious that the purpose of the acquisition of such a large acreage was to provide the operator with maximum flexibility in the development of its mining plan.

Westmoreland has projected the direction of its mining for a five-year period but has not yet determined the location of its mining activities at the expiration of that period. Many factors that are either presently unknown or uncertain will have to be considered before its further plans are formulated, and if a prediction were required at this time it would have to be based upon pure conjecture.

When a second five-year mining plan is capable of being formulated, a new or supplemental E.I.S. will of course have to be prepared, and in the meanwhile approval of the present plan will not extend permission to mine an acre outside those covered by it. We know of no requirement in NEPA, nor in any court decision interpreting it, which would impose on Westmoreland the necessity of making advance decisions that for it might be both unwise and costly.

But in addition, a requirement for long range planning for the life of the mining operation would be likely to cause the government an enormous and expensive duplication of effort. For, as mining progressed, the earlier plans would have to be abandoned and those substituted for them would require the federal agency to go through the laborious and expensive motions of preparing new sets of E.I.S.

Other courts have also recognized that the requirements of NEPA are circumscribed by a rule of reason. NEPA does not require a "crystal ball" inquiry, looking into the uncertain future and projecting exact events and environmental effects. Natural Resources Defense Council, Inc. v. Morton, 458 F. 2d 827 (D.C. Cir. 1972). Where it is impossible to forecast every possible effect or change in a program at the time of the filing of the initial impact statement, such projections will not be required. When such subsequent information does become available, it may then be brought to the attention of a decision-maker, Environmental Defense Fund v. Corps of Engineers, U.S. Army, 470 F. 2d 289 (8th Cir. 1972). As was stated in Jiccarilla Apache Tribe of Indians v. Morton, 471 F. 2d 1275 (9th Cir. 1973):

> Neither 102 (2) (B) nor (C) can be read as a requirement that complete information concerning the environmental impact of a project must be obtained before action may be taken. If we were to impose a requirement that an impact statement can never be prepared until all relevant environmental effects were known, it is doubtful that any project could ever be initiated. (471 F. 2d at 1280)

See also, Greene County Planning Board v. Federal Power Com'n., supra, where it was held that the Commission did not violate its duties by not requiring the Power Authority of the State of New York to divulge in its E.I.S. any plans which it may have had regarding future power projects.

The realization that an overall project may be too large to be manageable from an environmental impact statement standpoint, is clearly demonstrated by a number of highway cases. In Movement Against Destruction v. Volpe, supra, the plaintiffs urged that no action be taken on a highway system which consisted of several interrelated but independent highways until an environmental impact statement was filed for the entire project. The court rejected this contention and ruled that it was entirely appropriate for the Department of Transportation to limit its investigation and analysis to the one highway section then under review. The court noted at 5E.R.C., 1642:

> NEPA however does not expand the alternatives which must be discussed in an E.I.S. beyond those "realistic alternatives" that will be reasonably available within the time the "decision-making" official tends to act.

Thus it was determined that where it was uncertain that a separate stage of the project would be built and no decisions had yet been made about it, the E.I.S. need not cover such future and uncertain plans.

A similar question was raised in Citizens v. Brinegar, 5 E.R.C. 1231 (D. Ariz. 1973). The plaintiffs complained that an E.I.S. filed for one highway in a transportation system was inadequate for failure to include in the E.I.S. all environmental impacts that would flow from the entire proposed highway system. The court found that carrying the plaintiffs' position to an extreme would require that there be approval of the entire system before any work could be commenced. This, the court held, was not required by law. The segmenting of the highway for impact statement purposes was reasonable and would not be considered "piecemealing". Similarly in North Side Tenants' Rights Coalition v. Volpe, 346 F. Supp. 244 (E.D. Wis., 1972) it was determined that an impact statement covering only 21 miles of a 60 mile highway project was an appropriate unit. See also, Morningside-Lennox Park Assoc. v. Volpe, 334 F. Supp. 132 (N.D. Ga. 1971) where an environmental impact statement was only to cover a four mile segment of I-485.

In timing an E.I.S., a balance must be struck between early publication, before irreversible decisions have been made, and later publication based on a compilation of meaningful information. Scientists' Inst., supra. Projections, not prophesies, are required by NEPA. Id. To require Westmoreland Resources to include within its impact statement factors relating to its conduct subsequent to the initial five year period would be to invite the preparation of an E.I.S. based on mere prophesy. Westmoreland Resources is unable at this point to project the direction of its mining beyond that period with any degree of certainty, such as would be required for an E.I.S.

Warren J. Hancock
500 PETROLEUM BUILDING
Billings, Montana
59101

November 2, 1973

Mr. Wayne E.Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Re: Environmental Statements
Crow Ceded Area - Coal Lease
Westmoreland Resources Mining Proposal

Dear Mr. Stephens:

The environmental statement as prepared by the Bureau of Indian Affairs covering the proposal by Westmoreland Resources for strip mining coal in the Sarpy Creek Area in Big Horn County, Montana, has been reviewed by the writer. I believe this statement fully fulfills the requirements of the Environmental Protection Act and should be approved by the Secretary of the Interior. This statement does indicate that there may be some potential future problems; however, I am fully convinced these problems are minor, and in this currently environmentally oriented period the small problems that may occur in the future I am confident will be solved by industry that is now and will become even more able to cope with environmental problems.

I have resided in Montana since 1940 except for a period of military duty, and have spent this time actively engaged in various phases of the oil and gas industry. I have been exposed to the many current energy problems on a local, national and international basis. I served on the National Petroleum Council during their various recent studies, including the much quoted report which clearly shows the energy problems of not only the United States but the world, and further served on the Council during their environmental and conservation studies.

No response required.

All companies and individuals associated in the energy supply business are keenly aware of our current energy problems, and observe a potentially greater problem in the future should we not take farsighted steps to develop greater energy sources that are now available in this country.

There is no question in my mind that the vast coal reserves of the United States offer the only near term readily available, developable and usable source of relatively plentiful energy. Other forms have longer delay periods and various technological problems that delay their entry into the use phase a good number of years.

From my experience living in Montana, I believe that development of coal in the Sarpy Area will raise the standard of living of certain residents of the State to be compatible with other social segments in the United States; thus, coal development has a social impact on people residing in the State of Montana that is very desirable.

I respectfully submit that approval of the impact statement should be rapidly approved so that the Sarpy Creek coal can fill an important part in the need for energy and further improve the economic and standard of living for several social groups in Montana.

Respectfully submitted,

Warren J. Hancock

WJH/mr

Thomas E. Heald, C.L.U.
Mutual Benefit Life Building
Billings, Montana 59101

November 2, 1973

United States Department of Interior
Bureau of Indian Affairs
Planning Support Group
316 North 26th Street
Billings, Montana 59101

Attention: Director - Planning Support Group

Gentlemen:

I have just completed a review of the Environmental Impact Statement prepared by your office in preparation for the Sarpy Creek Mine to be opened by Westmoreland Resources.

No response required.

I am tremendously impressed with the thoroughness of your undertaking in this Statement. We are facing a national energy crises and a Mid-East crises and as a life-long native of Montana, I am wholeheartedly in favor of approving the mining plan at the earliest feasible date.

Sincerely,

Thomas E. Heald

Thomas E. Heald, C.L.U.

TEH:sa

MEMBER, AMERICAN SOCIETY OF CHARTERED LIFE UNDERWRITERS—MEMBER, MILLION DOLLAR ROUND TABLE
REGISTERED REPRESENTATIVE MUTUAL BENEFIT FINANCIAL SERVICE COMPANY

NORTHERN STATES POWER COMPANY

414 NICOLLET MALL
MINNEAPOLIS, MINNESOTA 55401
612-330-5500

ARTHUR R. RENQUIST
VICE PRESIDENT—LAW

ARLANO O. BRUSVEN
SECRETARY AND
FINANCIAL COUNSEL

GENE R. SOMMERS
RALPH S. TOWLER
DAVID G. McGANNON
JOSEPH D. BIZZANO, JR.
HAROLD J. BAGLEY
C. THOMAS DROSMAN
ATTORNEYS

November 13, 1973

Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Dear Sir:

Northern States Power Company has been provided with a copy of the draft environmental impact statement prepared by your organization, which is entitled CROW CEDED AREA COAL LEASE, WESTMORELAND RESOURCES, MINING PROPOSAL. The Company appreciates the opportunity to comment thereon.

Northern States Power Company has need for the low sulfur coal proposed to be mined by Westmoreland Resources for the reasons stated in the attached affidavit, which was filed in Civil Action No. 1182-73 pending before the United States District Court for the District of Columbia. Indeed, this need has not diminished since the advent of war in the Middle East and the reduction of oil imports from that area, and in view of the recent address by the President of the United States dealing with the energy crisis in this country.

We hope the foregoing comments will be considered by your Agency.

Yours very truly,

Joseph D. Bizzano, Jr.
JOSEPH D. BIZZANO, JR.

JDB:kp
Enclosure

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF COLUMBIA

Sierra Club, et al.,
Plaintiffs,
v.
Rogers C. B. Morton, et al.,
Defendants.

Civil Action
No. 1182-73

AFFIDAVIT OF WADE LARKIN
NORTHERN STATES POWER COMPANY

State of Minnesota)
) ss.
County of Hennepin)

WADE LARKIN, being duly sworn, says:

1. I am Group Vice President-Power Supply of Northern States Power Company (NSP). I make this affidavit in support of Intervenor Westmoreland Resources' (Westmoreland) Motion for Summary Judgment on behalf of Westmoreland in this action.

No response required.

2. NSP is a Minnesota corporation authorized to do business in Minnesota, North Dakota, South Dakota, and, through a wholly owned subsidiary, Wisconsin. Its main office and principal place of business is at 414 Nicollet Mall, Minneapolis, Minnesota. NSP's main business is to generate, transmit, and sell electric energy at wholesale and retail within its service territory in the States of Minnesota, North Dakota, South Dakota, and Wisconsin. NSP also transmits and receives electric energy to and from public utilities adjacent to its service territory. Approximately three million people

reside in NSP's four-state service area among which are included its 900,000 electric service customers. Nearly two-thirds of the inhabitants and customers served reside in the seven-county metropolitan area of Minneapolis-Saint Paul, Minnesota.

3. NSP operates an integrated system of nuclear and fossil-fired electric generating plants. The following table compares the type of fuel utilized as a percentage of system generation:

Fuel	Percent of Generation
Coal	49.4
Natural Gas	24.5
Nuclear	23.7
Oil	2.2
Manufactured Gas	0.2

In addition, the system has an insignificant hydro capacity.

Four large fossil-fired steam electric generating plants, having a combined generating capacity of nearly 2,000 megawatts, are located in the seven-county metropolitan area of Minneapolis-Saint Paul, Minnesota, to wit: Allen S. King Generating Plant near Stillwater, Minnesota; Black Dog Generating Plant, Bursnville, Minnesota; High Bridge Generating Plant, Saint Paul, Minnesota; and Riverside Generating Plant, Minneapolis, Minnesota. These plants are dependent primarily on coal as a source of fuel.

No response required.

4. In order to meet the requirements for low-sulfur coal at the aforementioned generating plants, NSP and Westmoreland entered into a long-term coal supply agreement on June 15, 1972. The agreement provides that deliveries of low-sulfur coal from Montana would commence not later than July 1, 1974, and terminate by December 31, 1993. Coal deliveries in 1974 and 1975 are to be at the rate of 1,900,000 tons annually. Starting in 1976 and for the balance of the contract, coal deliveries are to be made at the rate of 2,900,000 tons annually. Westmoreland's commitment for delivery is contingent upon obtaining the necessary approvals from governmental agencies, as well as obtaining certain rights in the surface of the land beneath which the coal reserves are located.

5. The coal to be delivered by Westmoreland initially is destined for use at the High Bridge Generating Plant since the present contract with another supplier to deliver low-sulfur coal to this plant will terminate in 1974. In 1975 and thereafter, deliveries from Westmoreland will be used to supply the low-sulfur coal requirements for the Allen S. King, Black Dog, and Riverside Generating Plants. As to the Riverside Plant, the present contract with another supplier to deliver low-sulfur coal will terminate in 1975.

6. The seven-county metropolitan area of Minneapolis-Saint Paul, Minnesota, comprises the Minneapolis-Saint Paul Air Quality Control Region (AQCR). This region has been designated as Priority I by the United States Environmental Protection Agency with respect to the attainment and maintenance of the national ambient air quality standards for sulfur oxides. In 1972, pursuant to the requirements of the Federal Clean Air Act, 42 U.S.C. § 1857, the Minnesota Pollution Control Agency adopted the Minnesota Air Quality Implementation Plan which included new air pollution control regulations. In order to control sulfur oxide emissions, these regulations provide that after June 1, 1973, large coal-burning installations in the Minneapolis-Saint Paul AQCR cannot burn coal having a sulfur content greater than 1.5% by weight. Prior to the adoption of the implementation plan, the four major generating plants located in the Minneapolis-Saint Paul AQCR burned high-sulfur coal from Illinois, with a sulfur content generally in excess of 3% by weight.

The Riverside and High Bridge Generating Plants presently have the facilities to enable them to take delivery of low-sulfur Montana coal, which is burned in mixture with high-sulfur coal to meet the applicable Minnesota sulfur-in-fuel regulation. Since a coal transshipment facility would first have to be built in order for the Allen S. King and Black Dog Generating Plants to take delivery of low-sulfur Montana coal, a project requiring one-to-two years for completion, a legally enforceable compliance schedule was agreed to in the latter part of 1972 by NSP and the Minnesota Pollution Control Agency which required compliance with the aforesaid sulfur-in-fuel regulation by June 1, 1975. This date coincided with the target date for meeting all national primary and secondary ambient air quality standards in Minnesota. By that date, it is contemplated that the Allen S. King and Black Dog Generating Plants will be burning a mixture of low-sulfur coal supplied by Westmoreland and high-sulfur Illinois coal such that these plants also will be in compliance with the sulfur-in-fuel regulation.

No response required.

7. The injunction asked by plaintiffs, the effect of which would be to postpone the timely delivery by Westmoreland of low-sulfur coal to NSP, would have a significant impact on NSP and its electric customers. If Westmoreland coal is unavailable to NSP in 1974 as scheduled, the High Bridge Generating Plant whose existing low-sulfur coal contract expires in 1974 will not have low-sulfur coal available for mixing with high-sulfur Illinois coal as of January 1, 1975, and thus would be in violation of the Minnesota sulfur-in-fuel regulation. Furthermore, the

continued unavailability of Westmoreland coal would prevent the Allen S. King and Black Dog Generating Plants from meeting their previously agreed to compliance schedules, as well as possibly prevent the Minneapolis-Saint Paul AQCR from attaining the national ambient air quality standards for sulfur oxides, all by June 1, 1975.

For all of 1975, NSP's requirements for low-sulfur western coal will be approximately 3,800,000 tons. Including the 1,900,000 tons of coal scheduled for delivery by Westmoreland in 1975, NSP has contracts for a total of 2,900,000 tons of low-sulfur western coal, leaving a deficit for 1975 of approximately 900,000 tons. If Westmoreland was enjoined from proceeding with its commitment to NSP, NSP would experience a deficit of 2,800,000 tons of low-sulfur coal for 1975.

For 1976, NSP's low-sulfur coal requirements will increase due to a new coal-fired generating unit coming on line to about 5,700,000 tons. Up to 5,500,000 tons of coal could be delivered in 1976 pursuant to an existing contract with another coal supplier from Montana, leaving a deficit of 200,000 tons of low-sulfur coal.

In 1977, with the scheduled start-up of another coal-fired generating unit, NSP's requirement for low-sulfur coal would approximate 7,000,000 tons for the year. Deliveries of low-sulfur coal in 1977 would amount to 5,500,000 tons (excluding Westmoreland coal), leaving a deficit of 1,500,000 tons. This amount is equivalent to the entire low-sulfur coal requirement of the Allen S. King Generating Plant plus about 40% of the low-sulfur coal requirement of the Black Dog Generating Plant. The combined generating capacity of these two plants is in excess of 1,000 megawatts.

No response required.

In 1978 and 1979, should Westmoreland continue to be unable to deliver coal pursuant to its contract with NSP, low-sulfur coal deficits in excess of 2,500,000 tons and 3,000,000 tons, respectively, would be experienced. The foregoing amounts are nearly equivalent to the entire low-sulfur coal requirements of all four major coal-fired generating plants located in the Minneapolis-Saint Paul AQCR.

8. The foregoing projected deficits of low-sulfur coal in the years 1975 to 1979, due to the inability of Westmoreland to honor its supply commitment to NSP for reasons associated with the instant action, could create a substantial burden on NSP, its customers, its security owners, as well as the inhabitants of the Minneapolis-Saint Paul AQCR.

If the broad injunctive relief sought by plaintiffs in this action were to include Westmoreland's present coal supply commitment to NSP, then it is highly unlikely that NSP would have available to it alternative sources of low-sulfur coal. Potential sources of such coal that would not be subject to the injunctive relief sought by plaintiffs would, as a result thereof, necessarily become the object of intense competition among all of the end users thereof, including NSP, and no end user, including NSP, could be assured of success in the competitive bidding therefor.

The use of low-sulfur oil is not a viable alternative to the projected deficits of low-sulfur coal. For example, in 1975 and 1977, if NSP were to operate all of its gas turbine peaking plants in a base load mode and if NSP could obtain the necessary quantities of low-sulfur oil to operate said plants, it might be possible for NSP in those years to meet its generating capacity obligations. However, approximately 420,000,000 gallons of oil would be required in 1975 and approximately 300,000,000 gallons of oil would be required in 1977 over and above the normal NSP requirement to accomplish this at a projected net increase in cost of about $55 million and $50 million, respectively. NSP at this time does not foresee any likelihood whatsoever of obtaining the foregoing enormous quantities of oil for use in its peaking plants. And even if this highly unlikely possibility were to materialize, the reliability of power supply to NSP's customers would be degraded; that is, the capability to continuously supply such customers would be adversely affected because of the abnormal operation of NSP generating facilities. Deterioration of NSP's generating facilities could result in an increased loss of generation through forced outages.

No response required.

As for the use of oil in the years 1973 and 1979 as an alternative to the low-sulfur coal deficits in those years, considerably more oil would have to be burned because of the larger coal deficits. However, the fact that NSP lacks the necessary gas turbine peaking plants to burn such additional quantities of oil, even if the oil could be obtained, would result in the inability of NSP to meet all of the power supply requirements of its customers. This situation obviously would be much more serious than the adverse effect on the reliability of power supply which was indicated for the years 1975 and 1977.

Another possible (though highly speculative) alternative to the projected low-sulfur coal deficits would be a variance under the applicable air quality standards to permit the burning of high-sulfur Illinois coal at the four major generating plants in the Minneapolis-Saint Paul AQCR. Implementation of this alternative could be detrimental to the health and welfare of the nearly two million inhabitants of the Minneapolis-Saint Paul AQCR.

Assuming that the appropriate governmental authorities would be inclined to grant the variance under the air quality regulations, it should be noted that the Federal Clean Air Act, 42 U.S.C. § 1857c-5(f), establishes the exclusive variance procedure under the Act which requires the Governor of the State to submit the variance request to the Administrator of the U.S. Environmental Protection Agency, and which limits such postponement or variance to one year. Favorable action of this type, which is highly unlikely or at least speculative, could provide relief only until about mid-1976, but not beyond that time.

Furthermore, any delay in Westmoreland meeting its commitment to supply low-sulfur coal to NSP will result in increased costs of mining the coal, and thus increase the cost of the coal to NSP. In turn, this increase would be reflected in the increased cost of electricity to NSP's customers.

No response required.

Any of the aforementioned additional costs and burdens must be borne by NSP, its customers, and security owners. The possible adverse effects on public health and welfare of not meeting the applicable air quality standards would have to be borne by the inhabitants of the Minneapolis-Saint Paul AQCR. The adverse effects on the reliability of power supply or the inability to supply power would have to be borne by NSP's customers. These added costs and burdens would be unreasonable and not in the public interest.

/s/ Wade Larkin
Wade Larkin

Subscribed and sworn to
before me this 27th day
of September, 1973.

/s/ Pearl S. Duggan
Notary Public

MacOil, Inc.

Hardin, Montana

November 8, 1973

Mr. Wayne Stephens
Planning support group
Bureau of Indian Affairs
Federal Building
Billings, Montana

Dear Sir,

I spent the greater part of November 6th attending a meeting at the Sun Lodge Motel, Crow Agency, Montana. At that time I listened to the pro and con arguments relative to the issuance of a permit to Westmoreland Ent erprises to mine coal in the Sarpy basin.

I have been in business in Hardin, Montana since 1941 and Montana, like the adopted son,is mine by choice, not by chance. Over these many years I have become increasingly fond of the area and its people and certainly wouldn't want to see it ravaged in any manner.

However, as one who was born and educated in Minnesota I wonder if we all wouldn't still be riding our ass, eating Kraut with the Huns or fish heads with the Japanese had not that state surrendered its God given deposits of iron ore to the nation. The same is true of Oklahome,Texas and others with their petroleum. I wonder how many of us would be living in caves if the great Northwest hadn't contributed its timber resources with which to build our homes. Therefore, I can't see how we can in conscience withhold, from our fellow men, the rich deposits of coal at a time whe n the nation is in such desperate need of energy.

No response required.

I wouldn't want this to be construed as a blanket endorsement of unlimited and unrestricted mining such as we experienced at Colstrip in the past. Also I certainly wouldn't want to see Eastern Montana turned into the boiler room of the nation with the resultant pollution of our environment.

At this time I would have to endorse the mining of our coal only for export out of the state. Than, after we have determined how much of our water we can afford for the projects and technology comes up with improved combustion methods we can explore the benefits of more extensive power generation and gassification.

Yours very truly,

MacOil Inc.

E. S. McIntyre, Pres.

MINERAL RESEARCH CENTER

Post Office Box 3708 • (406) 494-2778 • Butte, Montana 59701

November 19, 1973

Mr. Wayne Stevens
BIA Planning Support Group
Federal Building
Billings, Montana 59101

Dear Mr. Stevens:

Mr. Nick Tudor from Westmoreland Resources has contacted me requesting a statement of archaeological methods used on company land in 1972.

I am enclosing an outline of our research procedure for your use. If I can be of further assistance, please contact me at any time.

Sincerely yours,

Dale E. Fredlund
Research Archaeologist

DEF:pla

Enclosure

RESEARCH PROCEDURES EMPLOYED IN THE 1972 ARCHAEOLOGICAL SURVEY AND SALVAGE ON WESTMORELAND RESOURCES LANDS: SARPY CREEK, MONTANA

(Research Conducted for Statewide Archaeological Survey,
University of Montana, Missoula, Montana)

By

Dale E. Fredlund

Research Archaeologist

Montana College of Mineral Science and Technology Foundation

Mineral Research Center

Butte, Montana

On August 3, 1972, Westmoreland Resources contracted with the University of Montana Foundation to conduct an archaeological survey and testing on the following described lands located in Twn 1N37E, Bighorn County, Montana:

Sec.	Approximate Portion
Section 21	All
Section 25	West ½ and all of W ½ of NE ¼ lying West and South of the county road.
Section 26	All
Section 27	All
Section 28	All
Section 34	All of that part of the NE ¼ lying north of east of property fence line.
Section 35	All

After archaeological survey and testing was completed, one site, 24BH1728, was recommended for excavation. Thus, on September 1, 1972, Westmoreland Resources contracted with the University of Montana Foundation to conduct archaeological excavation on the recommended site.

Excavation of the site began September 5, 1972, and field work was finished on October 9, 1972.

Research Methods

Standard archaeological techniques used in the northern plains area were employed in this survey and salvage project. All steps are listed as follows:

No response required

1. Land owner permissions were obtained before entering on lands.
2. Local people were interviewed for their information concerning history and known prehistoric sites and artifact collections.
3. Contracted lands were given an intensive surface survey by walking each grid unit searching all valley floors, ridges, eroded areas, benches, rock outcrops, terraces and water sources.
4. All sites located were numbered according to the Smithsonian Trinomial System and recorded on archaeological site survey forms.
5. Each site surface was carefully searched for artifacts, etc.
6. Sites possessing possible importance were photographed and tested.
7. Four pits were tested for subsurface deposits by excavating a five-foot square in arbitrary two-inch levels. All lithic material was kept separate for each two-inch level.
8. All homesteads (2) were recorded, photographed and information collected from informants about their owners.

Excavation Techniques

Site 24RB1028 was excavated under the direction of Lynn B. Fredlund. Excavation techniques used included the following:

1. Photographing the site.
2. Established grid system on north-south direction.
3. Excavation in arbitrary two-inch levels. (Rodent action in soil had destroyed any possible natural stratigraphy.)
4. Charcoal samples were taken for C^{14} dating.
5. Soil samples were taken.
6. Flotation samples were taken.
7. FAUNAL Formal analysis conducted on recovered bone.

Hardin, Montana

November 2, 1973

Hon. John Melcher
House of Representatives
Washington, D. C.

Hon. Teno Roncalio
House of Representatives
Washington, D.C.

Mr. Joe Peters of Hardin, Montana sent a copy of this letter and requested it be included in the Environmental Impact Statement comments section.

RE: Proposed strip mining legislation in regard to private surface over federal owned coal

Dear Congressman Melcher and Congressman Roncalio:

It has been brought to my attention that the Honorable Mike Mansfield, Senator for the State of Montana, has submitted to Congress a Bill that would ban strip mining on lands where the federal government owns the coal and where the surface is owned by private individuals or corporations.

This bill will not apply to this Environmental Statement as the coal is owned by the Indian Tribe and not the Federal Government.

I am writing this letter to you in my capacity as a citizen of the State of Montana, a rancher in the Sarpy Creek Basin and in particular a rancher who has negotiated the sale of my surface rights to Westmoreland Resources.

Like myself and other ranches surrounding me, a great majority of all coal underlying our lands is owned by the Crow Tribe of Indians of Montana. The Westmoreland Resources, a partnership, has undertaken to obtain a coal mining lease from the Crow Tribe of Indians for the purpose of mining and extracting the low sulfur coal from the Sarpy Creek area. The Westmoreland Resources people contacted me, as myself and my wife, Pauline, were the owners of the surface under which coal owned by the Crow Tribe of Indians was deposited. Of my own free choice, through an arms length transaction, I chose to sell my surface rights to Westmoreland Resources.

As a direct benefit from the sale of my lands, I have been able to assure that my twin daughters will both graduate from accredited universities in the State of Montana. As another result, I have been able to free myself of other financial burdens that have continuously plagued cattlemen and ranchers for the past several years. The mere fact that I have sold my land does not mean that I am leaving the Sarpy Creek Area immediately. I still have the privilege of the use of the lands that I have ranched for the past twenty-two years and I foresee that I will still have the use of said lands for many years to come; it has been predicted that I may use these lands for another twenty years without so much of having one shovel of earth being turned.

I am quite confident that the reclamation plans of Westmoreland Resources in regards to the reclaiming of the surface and the environment of the Sarpy Creek Area will be successful as they are proposed.

It is my feeling as a rancher of the Sarpy Creek Community and it is my wife's feeling and the feelings of many of my neighbors, that any attempt made by the federal government to outlaw mining upon lands and premises where the surface is owned by individuals other than those owning the coal, is legislation that should be defeated as early as possible and not even be allowed upon the floor of the Senate or the House. In particular, where a private individual or corporation owns surface lands over federally owned coal, it is still my strong feeling that this coal should be removed with environmental considerations being foremost.

The "ban strip mining" fever is not as wide spread as people make it out to be, and I, for one, after a long study and due consideration, feel that the coal company will successfully restore the land to its former condition or a condition even superior to its former condition.

As I have stated above, I have benefited greatly in the sale of my surface over coal owned by the Crow Tribe of Indians and I feel that any attempt to prohibit the extraction of federally owned coal underlying private surface would deny myself and other ranchers like myself and other persons in my area and other areas where coal is deposited from determining the use of their own lands. I am a person that lives close at the situation as I am a landowner. I do not speak in hypothetical or theoretical terms. As I have stated, I have made my decision to sell my lands and it has been a free choice and as a result, I have enjoyed many benefits, and I, therefore, feel that any attempt by the Congress of the United States to ban the mining of federally owned coal where the surface above said coal is privately owned would be an invasion of my rights and other private surface owners' rights.

I thank you for your consideration of my thoughts upon this subject.

With best regards, I remain,

Very truly yours,

JOE PETERS

SELOVER BUICK INC.

523 NORTH 29TH ST. • BILLINGS, MONTANA 59101 • PHONE 406 – 252-5101

November 5, 1973

Mr. Wayne Stephens, Director
United States Department of Interior
Bureau of Indian Affairs
Planning Support Group
316 North 26th Street
Billings, Montana 59101

Dear Sir:

I would like to go on record as wholeheartedly endorsing the mining plan as revealed in the Environmental Impace Statement prepared by your office.

No response required.

I had no idea that this much work went into assuring us that mining in a responsible manner would be taking place. Certainly we could not require of industry any more than is revealed by your efforts.

Sincerely yours,

George H. Selover
President

GHS/jm

2811 Poly Drive
Billings, Montana 59102
October 31, 1973

Mr. Wayne E. Stephens, Director
Planning Support Group
Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Re: Environmental Statements
Crow Ceded Area - Coal Lease
Westmoreland Resources Mining Proposal

Dear Mr. Stephens:

I am appreciative of the opportunity to comment on the draft of the environmental statement as prepared by the Bureau of Indian Affairs covering the proposal by Westmoreland Resources for strip mining coal in the Sarpy Creek Area in Big Horn County, Montana.

A great deal of publicity has been given to the strip mining of coal in Southeastern Montana, and I am pleased to review what appears to be an extremely comprehensive study of the entire project as proposed by Westmoreland.

First of all, I would state that my employment is entirely in the field of oil and gas exploration and my knowledge of the prospect area and the operations to be located thereon is limited to a personal view on the ground of the Westmoreland Resources operation as it exists today, as well as having viewed the mines of Western Energy, Decker Coal Company, and Peabody Coal Company, all being located in Southeastern Montana.

No response required.

It is my opinion that this environmental statement should fulfill the requirements of the Environmental Protection Act, which requires such a statement in the event of substantive changes which would occur to the environment as a result of the proposed operations.

I personally believe that there are a great many more advantages than disadvantages to approval of the mining plan for the proposed Westmoreland Resources coal strip mining operation on Tract III of the Crow Indian Ceded Area.

There will be a great number of economic advantages to the community of Hardin, Montana, as well as Big Horn County and the surrounding area. As we all know, much of Eastern Montana is a very depressed area from an economic standpoint; and an operation of this magnitude could do much to raise the financial well-being of the people located therein.

Of even more importance is the financial impact on the Crow Tribe. It would appear to me that an income of the magnitude of $700,000 per year would go far towards giving the Crow Tribe real self-sufficiency and improved stability. This would, of course, include not only the royalties to the tribe, which could be used to improve the life in general for the Crow people, but also the salaries which would be paid to the persons actually working at the strip mining operation. It is my understanding that the Indians have been given a preferential right in job placement, and it is anticipated that about one-half of the total employment will be Indians. According to this report, this could mean an additional $700,000 to the Indian workers in the area.

The combined sum of $1,400,000 to the Indian people from an operation that will annually take 50 acres of land out of agricultural or livestock production, once the mine is open, leaves absolutely no comparison as to what a rancher would attain in income from a livestock operation in the Sarpy Creek Area from a like amount of land.

It is true that there will be some degradation to the environment by virtue of the strip mining operation. And it is true that at the present time very few people can absolutely guarantee that the land can be reclaimed to its former state. But I would submit that there will certainly be some instances where perhaps we do not want the land reclaimed to its former state and that there may be better uses to which it can be put after it has been mined. I personally feel very comfortable that, under the jurisdiction of the Bureau of Indian Affairs and the Geological Survey, as well as the other various federal and state agencies, the land will be mined in a proper manner and that the land will be restored to its original state as is economically and esthetically feasible. I also believe that the minimal detrimental effect to the environment is far overshadowed by the regional economic advantages and the need to alleviate some of the national energy problems.

Lastly, it is my firm conviction that the coal must be mined for the well-being of the United States of America. This country is presently in the throes of an energy crisis the likes of which we have never before faced. We have seen all too often in the last four or five years the vagaries of the Arab countries as regards the cutting off of low sulfur oil to the United States because of its foreign policy. We know that we cannot rely on the OPEC countries in the Middle East to provide the United States with an abundant supply of fuel, which unfortunately is no longer low-cost to the American public. Within the last week we have seen Venezuela raise its crude oil prices to the United States by 57 percent. It is my understanding that Libyan crude, as the result of additional recent price increases, will shortly cost almost $9 per barrel laid down in Houston or along the Gulf Coast. All of this coupled with our own inability to rapidly develop our domestic oil and gas industries to meet this crude oil shortage leads me to believe that the only accessible and viable source of energy left to the American public in an abundance is low-sulfur coal. As we all know, the majority of this type of coal in the United States is located in Montana, Wyoming, and North Dakota.

No response required.

There is absolutely no way that we can either produce or import sufficient crude in this country to sustain our ever-increasing energy consumption. Alternate sources of energy are anywhere from five to fifty years away from their fruition. While it is now politically expedient to emphasize the need to develop new resources of energy, our politicians seem to forget that there is an extensive time lag between the time that a project commences on the drawing board and until that particular source of energy becomes available to the public.

Consequently, I believe it is important that this draft environmental statement of Westmoreland Resources be improved, where possible, but that it should certainly be approved for mining by the Secretary of the Interior.

It is true that there will be some inconvenience and perhaps a changing of life for certain of the residents in the area. Nevertheless, I truly believe that we are going to have to mine this coal to supply the utilities and factories of our vast industrial complex. It is not completely realistic for us to believe that Montana can forever maintain its pristine environment. Certainly, all of us are in favor of doing all we can to see that we keep our clear air and pure water. What easier way to do this than to strip mine the coal that lies in abundance under the surface of our ground and ship it by unit train to other parts of the country, where it will be burned in their factories and power plants?

I greatly appreciate the opportunity to comment on this impact statement.

Respectfully submitted,

David Schaenen

Sportsmen's Supply Inc.

WHOLESALE ONLY

P. O. Box 20759
1535 Industrial Avenue

Telephone 252-2109
BILLINGS, MONTANA 59102

November 2, 1973

United States Department of Interior
Bureau of Indian Affairs
Planning Support Group
316 North 26th Street
Billings, Montana 59101

Attention: Director - Planning Support Group

No response required.

Dear Mr. Stephens:

I have just had an opportunity to review the Environmental Impact Statement as prepared by your office and appreciate the thoroughness of the statement.

I am hopeful that this Westmoreland project can get underway as soon as possible following the guide lines you have established.

Yours very truly,

SPORTSMEN'S SUPPLY, INC.

E. R. Kunn

ERK:dh

Hysham, Montana
Nov 15, 1973

Dear Sir;

We are ranchers and property owners for over 20 yrs, in the Sarpy area, near the mining site. This is home to our three children; two sons age 23 & 22 and a daughter age 13.

Over a year ago Westmoreland Resources approached us to sign an option on our ranch for $137.00 per acre. If they bought it, we could lease it back for as long as we wanted.

No response required.

They had drilled many test holes and knew we have lots of coal on our ranch. But — the Indians own the coal — so we would be selling only surface rights.

We talked it over with our children. They said go ahead sell to Westmoreland, as we can still continue our ranching operations. Economically speaking, how can a rancher do better? That's about three times the selling price of this land — and we still have the use of the land.

Five ranchers have sold and two have signed options to sell.

Already there are benefits from the coal money — mortages paid off, new automobiles, new homes, new machine sheds and other improvements in this area.

Also about 600 men are employed at the mine site. Most of them are local men; or bosses who have moved their families into Hardin. Hardin has benefited a great deal. These men are buying automobiles, gas, oil, groceries, clothes and so on. They are also paying more taxes. The taxes on the new equipment being erected amounts to a huge sum. Which is certainly helping Big Horn County. About half of the men employed are Indians. That pay check and the opportunity to work at a trade is a great benefit to them.

The new families in Hardin are an asset to the community. Right away they became involved in community affairs. They are taking active parts in the churches, in the Hospital work, in the schools and in other organizations.

As to reclaiming the land disturbed by mining — every year grains, legumes and grasses are seeded; and they grow, on these ranches.

No response required.

The M K. Construction Co. is stock piling top soil now to be put back on the disturbed land so why won't grasses grow on the mined land? It has already been proved that it will grow. In many places the reclaimed land will be better than it is now. Also there is alot of misunderstanding about the amount of land being stripped. The coal lies in seams, usually along ridges, therefore the stripping will be a hit and miss pattern. Many acres will never be touched.

It has been stated that our wildlife is disappearing due to the coal development. It is true the deer population has decreased. But it has been decreasing the last several years — not because of coal development but because of the extensive hunting in the area, the heavy spring snows and the increase of the coyotes.

Strip mining is a necessity. It is also the safest way to get the much needed energy. I'd much rather see a few acres of land disturbed than see hundreds of men killed in deep mining.

Sincerely
Mrs. Earl Stark

No response required.

HAROLD G. STANTON
RICHARD B. HOVLAND
JAMES E. TORSKE

LAW OFFICES
STANTON, HOVLAND & TORSKE
10 EAST FIFTH STREET
HARDIN, MONTANA 59034

TELEPHONE
AREA CODE 406
665-1510 AND 665-1511

November 13, 1973

Mr. Wayne E. Stephens
Director
Planning Support Group
316 North 26th St.
Billings, Montana 59101

Dear Mr. Stephens:

I have recently talked with Mr. Ralph Moore of Westmoreland Resources, Inc., and he indicated that it may be appropriate to convey some information known to me as City Attorney for the City of Hardin, Montana which may be useful in preparation of the final Environmental Impact Statement for strip mining of Crow Indian coal in the Sarpy area.

No response required.

The question to which I will address myself is what will be the requirement for additional law enforcement due to the influx of people working on the coal development. I have been informed that the organizations developing the mine in the Sarpy area reach maximum employment of approximately 400 employees during the summer of 1973. I am making the assumption that the greatest impact employment was felt in Hardin and to my knowledge, the Hardin police department operated at the same level as in years past. It is not felt that there was an increased crime rate requiring additional law enforcement in Hardin due to the expanded population due to the coal developments, nor is it anticipated that additional law enforcement will be required in the future due solely to the activities in the Sarpy area.

Whereas, there will be a number of new permanent jobs created by the coal development, a majority of these jobs will ultimately be staffed by local people; and, therefore, the City of Hardin does not anticipate any increased crime problem, thus requiring additional law enforcement due to the Sarpy area development.

James E. Torske
City Attorney
City of Hardin, Montana

Valley Motor Supply co.
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Billings, Montana STORE

November 15, 1973

REFER REPLY TO·

Planning Support Group
Wayne E. Stephens
B.I.A.
Federal Building
Billings, Montana

Dear Sir:

We would like to state our position on the debate to mine coal in the Sarpy Creek field...

After attending the meeting on November 6, at Crow Agency, we feel that immediate approval should be given to Westmoreland Resources to begin mining as soon as possible.

In addition to the immediate need for energy, we feel that the impact on the economy of eastern Montana is long overdue for a boost.

No response required.

As far as the complaint of some ranchers that if strip mining is permitted we may find ourselves short of food, how about all the interstate roads that have been built in Montana as well as the rest of the country? They have taken, for the most part, prime farm land or beautiful mountains.

This was called progress and gave many jobs to our Montana people, we feel that the same holds true for the mining of coal.

We do feel that when possible the land should be reclaimed, which probably, for the most part, means planting more sage brush to match the rest of the area.

Sincerely,

Charles A. Schafer
Valley Motor Supply Co.
C. A. Schafer, Manager

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208 NORTH 13TH
BILLINGS, MONTANA

November 12, 1973

U. S. Department of Interior and
Montana Department of State Lands Hearings
Planning Support Group Office
Federal Building
Billings, Montana 59101

Attention: Wayne E. Stephens

Dear Mr. Stephens:

We are definitely in favor of issuing a permit to Westmoreland Resources allowing them to strip mine coal in the Sarpy Creek Mine in Big Horn County.

No response required.

We feel that the industry and employment opportunities this will bring to Eastern Montana is what we need to keep the economy at a high level in this area. The additional business our company has done with Morrison-Knudsen Company has resulted in our hiring more help. It will help us keep the youth in Montana.

Sincerely yours,

VALLEY WELDERS SUPPLY, INC.

Charles Romee, Manager.

CFR:es